

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re DOWNSTREAM ADDICKS AND
BARKER (TEXAS) FLOOD-CONTROL
RESERVOIRS

Sub-Master Docket
No. 17-9002L

Senior Judge Loren A. Smith
(E-Filed January 10, 2023)

THIS DOCUMENT APPLIES TO:
ALL DOWNSTREAM CASES

**PLAINTIFFS' APPENDIX IN SUPPORT OF
RESPONSE TO MOTION FOR SUMMARY JUDGMENT AND
CROSS-MOTION FOR SUMMARY JUDGMENT**

VOLUME II OF VIII

Rand P. Nolen
FLEMING, NOLEN & JEZ L.L.P.
2800 Post Oak Blvd., Suite 4000
Houston, Texas 77056
Telephone: (713) 621-7944
rand_nolen@fleming-law.com

Richard Warren Mithoff
MITHOFF LAW
500 Dallas Street, Ste. 3450
Houston, Texas 77002
Telephone: (713) 654-1122
mithoff@mithofflaw.com

Jack E. McGehee
**MCGEHEE, CHANGE, BARNES,
LANDGRAF**
10370 Richmond Ave., Suite 1300
Houston, Texas 77042
Telephone: (713) 864-4000
jmcgehee@lawtx.com

Appointed Co-Lead Counsel for Plaintiffs

Of Counsel:

Russell S. Post
David M. Gunn
Parth S. Gejji
Bennett Ost diek
BECK REDDEN L.L.P.
4500 One Houston Center
1221 McKinney Street
Houston, Texas 77010
Telephone: (713) 951-6292
rpost@beckredden.com

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IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE UPSTREAM ADDICKS

AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIRS Sub-Master Docket No.

17-cv-9001L

Judge Charles F. Lettow

THIS DOCUMENT RELATES TO:
ALL UPSTREAM CASES

ORAL DEPOSITION OF VAL ALDRED

AUGUST 1, 2018

ORAL DEPOSITION OF VAL ALDRED, produced as a witness at the instance of the Defendant and duly sworn, was taken in the above styled and numbered cause on Wednesday, August 1, 2018, from 8:58 a.m. to 3:31 p.m., before Rene White Moarefi, CSR, CRR, RPR in and for the State of Texas, reported by computerized stenotype machine, at the offices of Potts Law Firm, 3737 Buffalo Speedway, Suite 1900, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and any provisions stated on the record herein.

<p style="text-align: right;">Page 10</p> <p>1 Q. Were you born in Houston?</p> <p>2 A. I was.</p> <p>3 Q. And between the time that you were born</p> <p>4 and the time you graduated high school, did you live</p> <p>5 in Houston the entire time?</p> <p>6 A. I did.</p> <p>7 Q. And once you graduated from high school,</p> <p>8 did you go to college?</p> <p>9 A. Yes.</p> <p>10 Q. And where did you attend college?</p> <p>11 A. Austin, University of Texas.</p> <p>12 Q. And did you graduate -- and when did you</p> <p>13 graduate?</p> <p>14 A. Let's see. I think the -- I left in</p> <p>15 December '74. I think the actual diploma was like</p> <p>16 in April or whatever, the spring of '75.</p> <p>17 Q. Okay. And after you graduated college,</p> <p>18 did you move anywhere?</p> <p>19 A. No, stayed here in Houston.</p> <p>20 Q. Okay. And did you take a new job?</p> <p>21 A. I did. I worked at a CPA firm in</p> <p>22 downtown Houston. It's no longer in existence.</p> <p>23 It's been bought out and -- long ago.</p> <p>24 Q. Are you a CPA by training?</p> <p>25 A. Yes. I have an accounting degree from</p>	<p style="text-align: right;">Page 12</p> <p>1 headquarters.</p> <p>2 Q. When did you move to Bakersfield,</p> <p>3 California?</p> <p>4 A. In 1978.</p> <p>5 Q. So you were in Occidental, then, for</p> <p>6 about two years from 1976 to 1978 in the Houston</p> <p>7 office?</p> <p>8 A. That's right.</p> <p>9 Q. Okay. And then you moved to Bakersfield</p> <p>10 in 1986?</p> <p>11 A. No, 1978.</p> <p>12 Q. Sorry. 1978.</p> <p>13 A. That's okay.</p> <p>14 Q. Sorry about that.</p> <p>15 How long were you in Bakersfield for?</p> <p>16 A. Let's see, I left Bakersfield in -- well,</p> <p>17 we officially as a family pulled -- you know, pulled</p> <p>18 up roots and moved back here in July of '97. I</p> <p>19 myself came -- came here, oh, probably in March of</p> <p>20 '97 to -- to look for a job.</p> <p>21 The position I had as a chief financial</p> <p>22 officer for a dental organization ended. My father</p> <p>23 had just died, and I thought that would be a good</p> <p>24 time to return to Houston. The economy was better</p> <p>25 here than it was in California. And I just,</p>
<p style="text-align: right;">Page 11</p> <p>1 Texas and passed the CPA exam in 1986. The license</p> <p>2 is no longer valid.</p> <p>3 Q. How long did you work at that first firm?</p> <p>4 A. Four or five months, just -- I think</p> <p>5 almost up until the -- when tax season was over.</p> <p>6 Q. Okay. Did you begin a new job after</p> <p>7 that?</p> <p>8 A. I did. I -- shortly after that, I went</p> <p>9 to work for Occidental Petroleum in their internal</p> <p>10 audit department. Actually, no, that's not right.</p> <p>11 Excuse me. There was one in between. It was</p> <p>12 Charter -- Charter Exploration for about a year.</p> <p>13 Q. What was the nature of your employment at</p> <p>14 Charter Exploration?</p> <p>15 A. I was a revenue accountant.</p> <p>16 Q. Okay.</p> <p>17 A. You know, general accountant.</p> <p>18 Q. What about at Occidental?</p> <p>19 A. In Occidental, I started -- I was with</p> <p>20 Occidental for about ten years and a month. Started</p> <p>21 in 1976, May -- I believe in May of '76 and left in</p> <p>22 about May of '86. I started in their internal audit</p> <p>23 department based here in Houston. Traveled a lot,</p> <p>24 and then I got promoted, if you will, or relocated</p> <p>25 to Bakersfield, California, in their oil and gas</p>	<p style="text-align: right;">Page 13</p> <p>1 frankly, got tired of living in California and</p> <p>2 wanted to be -- wanted to come back with my family.</p> <p>3 Q. Okay. Have you -- have you been in</p> <p>4 Houston ever since 1997?</p> <p>5 A. Yes, I have. I've lived in the same</p> <p>6 house that I'm living in now for about 21 years and</p> <p>7 a couple of weeks now.</p> <p>8 Q. And that house is located at 825</p> <p>9 Thornvine Lane?</p> <p>10 A. 835.</p> <p>11 Q. 835 Thornvine Lane?</p> <p>12 A. 835 Thornvine Lane, 77079.</p> <p>13 Q. Do you have any specialized education in</p> <p>14 real estate?</p> <p>15 A. Specialized? What do you mean by that?</p> <p>16 Q. I think you mentioned that you worked as</p> <p>17 an accountant.</p> <p>18 A. (Moving head up and down.)</p> <p>19 Q. Did you ever -- did you ever in the</p> <p>20 course of your job come across real estate listings?</p> <p>21 A. Not in the -- in the course of a job. I</p> <p>22 mean, when I was buying my house, I came across a</p> <p>23 lot of real estate listings because I was in the</p> <p>24 market to buy a house.</p> <p>25 Q. You're not a licensed real estate</p>

<p style="text-align: right;">Page 18</p> <p>1 you're --</p> <p>2 Q. Okay. Well, I apologize because it's not</p> <p>3 labeled. Maybe we can look at another map where</p> <p>4 this is labeled.</p> <p>5 A. That's -- whatever you choose. Is</p> <p>6 that -- is that the green line you're referring to?</p> <p>7 Q. I believe that's actually Langham Creek,</p> <p>8 and Turkey Creek is a little bit closer to your</p> <p>9 property, and it is a tributary that comes off of</p> <p>10 Langham Creek. But that is something that we can</p> <p>11 address at a later point.</p> <p>12 A. I think you're right.</p> <p>13 Q. Yeah.</p> <p>14 A. You're right.</p> <p>15 Q. Yeah, you can put this aside for now.</p> <p>16 We're going to refer to it later.</p> <p>17 A. Okay.</p> <p>18 (Exhibit 3 marked.)</p> <p>19 BY MS. IZFAR:</p> <p>20 Q. So this I'm going to mark as Exhibit 3.</p> <p>21 You're -- you'll recall that we had a number of</p> <p>22 inspectors come to your home. Do you recall that,</p> <p>23 Mr. Aldred?</p> <p>24 A. I do. You -- I think you were one of</p> <p>25 them.</p>	<p style="text-align: right;">Page 20</p> <p>1 Q. And was this the first home you lived in</p> <p>2 when you moved back to Houston?</p> <p>3 A. Yes.</p> <p>4 Q. I believe you mentioned earlier that you</p> <p>5 looked at a number of real estate listings. Were</p> <p>6 you looking at them from California?</p> <p>7 A. No, I was looking at them from here. I</p> <p>8 had stayed with my mother at the time and got on the</p> <p>9 computer, looked at listings.</p> <p>10 Q. The computer in 1997?</p> <p>11 A. It was amazing. I know. Internet was, I</p> <p>12 think, still just starting at the time.</p> <p>13 Q. Do you recall what websites you looked</p> <p>14 at?</p> <p>15 A. No.</p> <p>16 Q. Okay. Did you work with a real estate</p> <p>17 agent?</p> <p>18 A. Yes, I did. I think it was -- I want to</p> <p>19 say from Greenwood King, maybe.</p> <p>20 Q. Okay. Do you recall how many -- how long</p> <p>21 your search took?</p> <p>22 A. Let's see. Probably three, maybe four</p> <p>23 months.</p> <p>24 Q. And do you recall how many listings you</p> <p>25 looked at, approximately?</p>
<p style="text-align: right;">Page 19</p> <p>1 Q. Do you -- I'll represent to you that this</p> <p>2 is a floor plan that one of the inspectors created.</p> <p>3 Take a look at this floor plan. And no need to pay</p> <p>4 particular attention to any of the dimensions. But</p> <p>5 tell me if this floor plan accurately depicts the</p> <p>6 layout of your home.</p> <p>7 A. Let me start from the bottom here,</p> <p>8 because it threw me off a little bit looking at that</p> <p>9 shape to the right-hand corner.</p> <p>10 I would say it's pretty complete. It</p> <p>11 fails to have a -- the bedrooms on the -- on the</p> <p>12 upper floor as part of the scheme, but, yeah,</p> <p>13 that's -- it's -- it's accurate for the way it's</p> <p>14 represented --</p> <p>15 Q. Okay.</p> <p>16 A. -- as shown.</p> <p>17 Q. So the top floor, the second floor, is</p> <p>18 not fully completely depicted on this map, but the</p> <p>19 first floor is accurate?</p> <p>20 A. I couldn't -- I couldn't vouch to the</p> <p>21 dimensions, but the -- the layout is correct.</p> <p>22 Q. Okay. Okay. Let's put this aside for</p> <p>23 now.</p> <p>24 When did you first purchase your home?</p> <p>25 A. July of 1997.</p>	<p style="text-align: right;">Page 21</p> <p>1 A. 20 or 30, maybe.</p> <p>2 Q. Do you recall how many you looked at with</p> <p>3 your real estate agent?</p> <p>4 A. Less, probably 15.</p> <p>5 Q. Okay. How did you find your home at 835</p> <p>6 Thornvine?</p> <p>7 A. Great question. So I had seen a house</p> <p>8 south of Memorial that looked particularly</p> <p>9 interesting. And I think they were asking about</p> <p>10 \$240,000 at the time, so I thought, well, I'll do</p> <p>11 some comparisons and see what else, you know, if</p> <p>12 that's a fair price to know how to make an offer.</p> <p>13 And then I came across the house I'm</p> <p>14 living in now that somehow had evaded the radar when</p> <p>15 I was looking at houses to begin with. And it was</p> <p>16 being listed for, like, 210 or somewhere</p> <p>17 thereabouts, which was a lot more affordable for me</p> <p>18 at the time, because I was unemployed. You know, I</p> <p>19 was trying to sell a house in California and --</p> <p>20 anyway, so I came across that -- the house at 835</p> <p>21 Thornvine and looked at it and said, you know,</p> <p>22 it's -- it needs a little TLC, tender loving care,</p> <p>23 but it was, like, \$30,000 less. And so I said, you</p> <p>24 know, it's probably just as good as any that's in</p> <p>25 Spring Branch Independent School District, which is</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 PHILLIP AZAR

9
 JULY 9, 2018
10 -----

11
12 ORAL DEPOSITION OF PHILLIP AZAR, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 9th day of July, 2018, from 9:02 a.m. to
16 5:03 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Kirby
18 Mansion, 2000 Smith Street, Suite 550, Houston, Texas
19 77002, pursuant to the Federal Rules of Civil Procedure
20 and the provisions stated on the record or attached
21 hereto; that the deposition shall be read and signed
22 before any notary public.

1 And then I moved to, during law school,
2 Constitutional Square Apartments and it was on
3 Greenridge. And that's over close to the Galleria area.

4 Q. Approximately when did you live in that
5 neighborhood?

6 A. During my law school career. During my law
7 school.

8 Q. When was that?

9 A. Probably 1979 through '82.

10 Q. Where did you live after that?

11 A. Four Leaf Towers.

12 Q. Where are Four Leaf Towers?

13 A. It's close to the Galleria, closer to the
14 Galleria. It's over on Post Oak.

15 Q. How long did you live there?

16 A. Until I found a house through Magnolia Bend.
17 Probably about two years or maybe three years.

18 Q. What year did you purchase the Magnolia Bend
19 property?

20 A. In 1990, I believe. October 31st, 1990, was
21 the day my father passed away. A lot of people pass
22 away around here. Sorry.

23 Q. Sorry to hear that.

24 So you said you were living in the
25 Constitutional Square Apartments until approximately

DEPOSITION OF JANA CANAN BEYOGLU

DEPOSITION AND ANSWERS of JANA CANAN BEYOGLU, taken before Edith A. Boggs, a certified shorthand reporter in Harris County for the State of Texas, taken at the law offices of Neel, Hooper & Banes, PC, 1800 West Loop South, Suite 1750, Houston, Texas, on the 18th day of September, 2018, between the hours of 1:49 p.m. and 5:06 p.m.

1 you owned prior to Harvey?

2 A. Correct.

3 Q. And then Harvey, you purchased another one?

4 A. We purchased another one, that's right.

5 Q. Okay. And how long were you at the Maplewood
6 address?

7 A. We moved in 1998, and we moved to the other
8 house in 2005. So, between 1998 and 2005, I was in the
9 Maplewood house. Seven years maybe.

10 Q. And the 107 Warrenton Drive house, the one that
11 flooded, how long were you there?

12 A. Until Harvey. 12 years. 2005 until 2017.

13 Q. And the new house that you purchased in Aliso?

14 A. End of February. We purchased the end of
15 February of this year. So, only a few months.

16 Q. Did you purchase any flood insurance for the
17 Maplewood house?

18 A. Yes, we did.

19 Q. Why did you purchase flood insurance that
20 house?

21 A. What did?

22 Q. Why.

23 A. I don't know if it's the proper answer but I
24 purchase insurances for everything that I buy. So,
25 Maplewood, I don't remember why I did but we were new in

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
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 THIS DOCUMENT RELATES TO)
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 DANA CUTTS

9
 JUNE 27, 2018
10 -----

11
12 ORAL DEPOSITION OF DANA CUTTS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 27th day of June, 2018, from 9:07 a.m. to
16 2:55 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at the
18 offices of McGehee, Chang, Landgraf, 10370 Richmond
19 Avenue, Suite 1300, Houston, Texas 77042, pursuant to
20 the Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 Q. Okay. And what year did you purchase the
2 property?

3 A. In 1976.

4 Q. Okay. Did you know the prior owners of the
5 property?

6 A. I met them, but I did not know them previously.

7 Q. Okay. Do you recall how much you paid for the
8 property when you purchased it?

9 A. Yes.

10 Q. And what amount did you pay for that property?

11 A. \$60,000 or fifty-nine nine. \$59,900. I have
12 to be very specific here because I know it's all being
13 written. Sorry.

14 Q. Okay. And are there any documents that reflect
15 this purchase price?

16 A. I don't know if we have any left after the
17 after-Harvey flood that we experienced.

18 Q. Okay. Let me take a quick detour and ask about
19 the documents that were lost during Harvey. You
20 mentioned that you lost many documents during Harvey.

21 A. We did.

22 Q. Okay. Can you describe where those documents
23 were kept.

24 A. They were kept in file cabinets.

25 Q. In what room of the house?

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE DOWNSTREAM : Sub-Master Docket

3 ADDICKS AND BARKER : No. 17-cv-9002L

(TEXAS) FLOOD-CONTROL :

4 RESERVOIRS : Judge Susan G.

: Braden

5 :

THIS DOCUMENT RELATES :

6 TO: :

ALL TEST PROPERTIES :

7
8 * * *

9 MONDAY, SEPTEMBER 17, 2018

10 * * *

11
12 Oral deposition of INGA GODEJORD taken
13 at the law offices of Neel, Hooper & Banes,
14 P.C. 1800 West Loop South, Suite 1750,
15 Houston, Texas, commencing at 1:01 p.m.
16 before Debbie Leonard, Registered Diplomat
17 Reporter, Certified Realtime Reporter.

18
19
20
21
22
23 * * *

1 did you live when you first moved to Houston?

2 A. Do you need an address?

3 Q. If you recall.

4 A. It was an apartment complex on
5 Eldridge Parkway, so we rented an apartment
6 there.

7 Q. Were you living with your
8 husband?

9 A. Yeah.

10 Q. And where did you move after
11 that apartment on Eldridge?

12 A. 14334 Heatherfield Drive,
13 Houston.

14 Q. And is that the property that's
15 at issue in this lawsuit?

16 A. Yeah.

17 Q. So I'd like you to look at
18 Exhibit 1.

19 (Previously marked Exhibit
20 Godejord-1 was referred to the
21 witness.)

22 THE WITNESS: Uh-huh.

23 BY MS. HELD:

24 Q. Now, I'm not sure if you've
25 actually -- if you've seen this document or

1 Q. And at the time you purchased
2 the property, were you aware of the existence
3 of the waterway called Buffalo Bayou?

4 A. No.

5 Q. Mrs. Godejord, what is your
6 educational background?

7 A. I have a degree in fine arts.

8 Q. And are you presently employed?

9 A. No. I'm a housewife.

10 Q. So just for the record, do you
11 have any specialized education in hydrology?

12 A. No.

13 Q. Or how about residential
14 appraisals?

15 A. No. It's just fine arts.

16 Q. And have you ever worked for
17 the Army Corps of Engineers?

18 A. No.

19 Q. Have you ever worked for the
20 United States government?

21 A. No, never.

22 Q. So when you purchased your home
23 in 2008, what was the reason why you -- what
24 was the use that you were going to make of
25 the home?

1 A. What do you mean? Use?

2 Q. What were you going -- why did
3 you purchase that home? Was it to live in?
4 Was it to rent?

5 A. To live in. And we lived in
6 there, yeah, for ten years. To live in.

7 Q. And over that period of time,
8 who has lived in the house with you?

9 A. My husband and my son.

10 Q. And what -- how did you get the
11 funds to pay for the house?

12 A. We took a loan.

13 Q. And when you purchased the
14 property -- well, have you made any changes
15 to the house between the time you purchased
16 the property and when Hurricane Harvey
17 happened?

18 A. You mean some renovation or
19 some --

20 Q. Yes. Any renovations or
21 additions, type -- things like that?

22 A. The biggest renovation was our
23 roof after the Ike, so we changed that. And
24 then there was small things, like changing
25 garage doors or plumbing or something, yeah,

IN THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE UPSTREAM ADDICKS §
AND BARKER (TEXAS) §
FLOOD-CONTROL RESERVOIRS § SUB-MASTER DOCKET

§ NO. 17-cv-9002L

____ §
§ Chief Judge Susan G. Braden

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

____ §

ORAL DEPOSITION

MR. JEREMY E. GOOD

July 19, 2018

ORAL DEPOSITION OF MR. JEREMY E. GOOD, produced
as a witness at the instance of the United States and
duly sworn, was taken in the above-styled and
numbered cause on the 19th day of July, 2018, from

a.m. to 12:23 p.m., before Michelle Hartman, 9:00
Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Raizner Slania, LLP, 2402 Dunlavy Street, Houston,
Texas 77006, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached hereto.

1 Q. I am not sure the dates match up to
2 what we said in my mind, so I'm just going to ask:
3 Would you please tell me whether you think this
4 document properly reflects your lost rents?

5 A. This looks like something that my wife
6 did for our tax purposes for the year 2017. So it
7 just goes through the end of the calendar year of
8 2017, not reflecting anything of 2018.

9 Q. Okay. Okay. So then I am just going
10 to go back and ask you again to say maybe what you
11 said before that I didn't quite follow.

12 A. Certainly.

13 Q. And that is the end of 2000 -- for Unit
14 A, it was -- it was not occupied until the end of --
15 through December 31, 2017.

16 When was it re -- it was reoccupied on
17 February 1?

18 A. February the 1st, 2018.

19 Q. And is that true for Unit B?

20 A. Sometime in January. So middle
21 January.

22 Q. And C?

23 A. February 1, 2018.

24 (Exhibit 17 marked)

25 Q. (BY MR. DAIN) Can you tell me what

1 Exhibit 17 is?

2 A. Document 17 is the HUD Settlement
3 Statement for our purchase of 760 Memorial Mews in
4 January of 2015.

5 Q. Okay. Thank you.

6 (Exhibit 18 marked)

7 Q. (BY MR. DAIN) Handing you what's been
8 marked Exhibit 18. Could you tell me what that
9 document is?

10 A. Document 18 was the appraisal that we
11 had done in December of 2014 to determine -- to
12 determine the value of the property.

13 Q. Other than determining the property --
14 the value of the property, was it done for any other
15 reason?

16 You weren't seeking -- did you need to
17 seek a loan or was this just something you did to --
18 as part of your diligence on the property?

19 A. I don't recall the exact motivation for
20 this other than this is the prudent thing to do in
21 purchasing property. There was nothing specific that
22 we were looking for other than overall value and
23 condition of the property.

24 Q. And that document reflects the opinion
25 value of 360,000, which is the amount you paid,

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 WAYNE HOLLIS
10 JULY 19, 2018
11 -----

12 ORAL DEPOSITION OF WAYNE HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 8:59 a.m. to
16 12:13 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.

<p style="text-align: right;">Page 10</p> <p>1 in Vietnam. And I wound up with his portion of my 2 property, the 30 acres I started with. 3 And we put together -- fortunately, I've 4 been able to put together, all out of the old family 5 farm, all contiguous, almost 400 acres now back, too. 6 And I raise cattle on it and hay. 7 Q. That was going to be my next question, if there 8 was livestock. Very good. So -- 9 A. And horses, so... 10 Q. And horses. So it's still an active -- active 11 farm? 12 A. Yes, it is. 13 Q. Do you have a farm manager or someone from your 14 family who -- 15 A. I have a young couple of guys that I've helped 16 put through junior college, and they work for me 17 part-time. But John and I, my son, actually run it and 18 make everything work. 19 Q. Very nice. And how many -- 20 A. Out of Houston here, so... 21 Q. How many head do you -- 22 A. I'm running 38 head of mother cows right now 23 and two bulls and eight or nine horses. 24 Q. And is it a calf-cow operation, or... 25 A. It's a cow-calf operation. I have F1 mother</p>	<p style="text-align: right;">Page 12</p> <p>1 Q. And have -- have you worked your way up to the 2 position you have with them now? 3 A. Yes. 4 Q. Why don't you tell me a little bit about what 5 you've done with them over your 52 years. 6 A. I started out as a sales management trainee, 7 first couple of years. And then I got activated again 8 and had to go back to the military full-time for about 9 six months. I came back. They put me right back in the 10 program, and I was our demonstrator operator for about a 11 year when they came out with a new type scraper that 12 Caterpillar had built. And then I became a product 13 support rep, which I went out and sold the service and 14 repairs on the machine. 15 And in '74, they made me a -- 1974, I 16 became a general line sales guy. And about '84, '85, 17 they moved me into this national accounts position, and 18 I call on the major contractors from all over the U.S. 19 and all over the world that work in our area. 20 Q. So do you -- do you have to travel quite a bit 21 for the national account? 22 A. I did have to travel a lot. I don't travel as 23 much anymore. 24 Q. And just domestic travel or overseas as well? 25 A. No. I've traveled to Germany on business, to</p>
<p style="text-align: right;">Page 11</p> <p>1 cows, Brahman, Hereford-cross, with Angus or Brangus 2 bulls on them. 3 Q. Excellent. 4 So you said you and your brother both 5 served in the military. What years were you in the 6 military? 7 A. I was in the Air Force Reserves from 1966 to 8 '71. 9 Q. Very good. And did you serve overseas as well? 10 A. No, I never had to go overseas. 11 Q. Well, thank you for your service, your family. 12 That's commendable. And I'm sorry about the loss of 13 your brother. 14 A. Thank you. 15 Q. And, Mr. Hollis, are you still -- aside from 16 your ranching operation, are you still working or are 17 you retired? 18 A. No. I'm employed. 19 Q. You're employed. Okay. And how so? 20 A. I'm with Mustang Cat, the Caterpillar dealer in 21 the Houston area. And I'm their special account sales 22 manager. 23 Q. Very good. And how long have you been with 24 Mustang Caterpillar? 25 A. 52 years and 4 or 5 months.</p>	<p style="text-align: right;">Page 13</p> <p>1 England on business, Mexico. And let's see. I've been 2 to Costa Rica, Belize. Just -- not real foreign travel, 3 but this -- you know, some local travel, too. I had a 4 lot of local travel. 5 Q. Yeah, I can imagine. 6 And aside from your high school education 7 that you've described for me, certainly the education 8 you received during your service in the military, and 9 your 52 years at Caterpillar, any other higher education 10 that you've -- 11 A. Yes. I have an agricultural business degree 12 from Sam Houston State University; graduated in 1965. 13 Q. Very good. All right. I'd like to turn next 14 to talking about your property, your home, a little bit. 15 Let me just have you state the street address of your 16 home for the record. 17 A. State what? I'm sorry. 18 Q. The street address of your home. 19 A. Oh, the street address is 14914 River Forest 20 Drive, Houston, Texas 77079. 21 Q. And is the home at that address your primary 22 residence? 23 A. Yes. 24 Q. And do you own that property jointly with your 25 wife?</p>

<p style="text-align: right;">Page 14</p> <p>1 A. Yes.</p> <p>2 Q. Do you own any other property, residential</p> <p>3 property in the Houston area?</p> <p>4 A. Yes.</p> <p>5 Q. And where is that property?</p> <p>6 A. I have a commercial operation that has a home,</p> <p>7 two-bedroom house on it, Baytown, Texas. It's under</p> <p>8 Hollis Marine. I rent out dock space and rent the house</p> <p>9 occasionally.</p> <p>10 Q. So is that on the lake or on the shore?</p> <p>11 A. No. It's on Galveston Bay, saltwater.</p> <p>12 Q. And did that home also experience some -- some</p> <p>13 flooding or any damage from Hurricane Harvey?</p> <p>14 A. No.</p> <p>15 Q. And from the review of some documents that</p> <p>16 you've provided, I understand you purchased your home on</p> <p>17 River Forest Drive in January of 1984; is that correct?</p> <p>18 A. December of 1983, and closed in January of '84.</p> <p>19 Q. Got it. Thank you.</p> <p>20 And aside from the period following</p> <p>21 Hurricane Harvey which we'll discuss today, have you and</p> <p>22 your wife lived in that home since you closed in January</p> <p>23 1984?</p> <p>24 A. Yes, contiguously we've lived there.</p> <p>25 Q. Okay. And do you recall how much you paid for</p>	<p style="text-align: right;">Page 16</p> <p>1 So the school district was a motivating</p> <p>2 factor for your decision?</p> <p>3 A. Yes.</p> <p>4 Q. Okay. Any -- any other factors besides the</p> <p>5 style of the house and the school district that</p> <p>6 influenced your decision to buy in the neighborhood?</p> <p>7 A. No.</p> <p>8 Q. Let me take out a map.</p> <p>9 (Exhibit 1 marked.)</p> <p>10 MR. HARTMAN: Mr. Hollis, I just want to</p> <p>11 tell you that if you check out the compass star, north</p> <p>12 is pointing left, the orientation.</p> <p>13 THE WITNESS: Yes, I -- I see that. And</p> <p>14 east is north.</p> <p>15 MS. TARDIFF: A little confusing.</p> <p>16 Q. (BY MS. TARDIFF) So what we've marked as</p> <p>17 Deposition Exhibit 1 -- let me see if my glasses fail me</p> <p>18 here. The Bates Number is Harris 0000459. The second</p> <p>19 page is Harris 0000453. And I'll represent to you,</p> <p>20 Mr. Hollis, that this is some excerpts from the</p> <p>21 subdivision plats for your neighborhood.</p> <p>22 So am I correct that your neighborhood is</p> <p>23 known as Nottingham Forest?</p> <p>24 A. Nottingham Forest 8.</p> <p>25 Q. Nottingham Forest 8. So are there a number of</p>
<p style="text-align: right;">Page 15</p> <p>1 the property in 1984?</p> <p>2 A. Yes, I do. We paid 200,000 for it.</p> <p>3 Q. And what area of Houston were you living in</p> <p>4 before you purchased your home in 1984?</p> <p>5 A. In that same area, about a mile south of where</p> <p>6 we are now.</p> <p>7 Q. Did that neighborhood have a name, do you</p> <p>8 recall?</p> <p>9 A. Ashford -- the Ashford area. The Ashford</p> <p>10 Hollow, I guess you'd call it.</p> <p>11 Q. And were you owning or renting there?</p> <p>12 A. I owned that home.</p> <p>13 Q. Okay. Any experience with flooding at that</p> <p>14 home while you owned it?</p> <p>15 A. No, none.</p> <p>16 Q. So tell me a little bit about the process of --</p> <p>17 of finding the home that you purchased in December of</p> <p>18 1983, closed in January 1984.</p> <p>19 A. Our son was just going into junior high. And</p> <p>20 we lived in the Houston HISD school district, and we</p> <p>21 wanted to move into the Spring Branch school district.</p> <p>22 And my wife, being from the south, Alabama, found this</p> <p>23 colonial home that looked like Alabama and insisted we</p> <p>24 purchase it.</p> <p>25 Q. It does have that look, I agree.</p>	<p style="text-align: right;">Page 17</p> <p>1 Nottingham Forest neighborhoods?</p> <p>2 A. Yeah. Yes, there is.</p> <p>3 Q. So when you tell people what neighborhood you</p> <p>4 live in, do you just say Nottingham Forest or...</p> <p>5 A. No. We add the 8.</p> <p>6 Q. Add the 8. Okay.</p> <p>7 And looking at the first page here, do you</p> <p>8 recognize the location of -- of your parcel under the</p> <p>9 Forest?</p> <p>10 A. I assume -- I assume it's number 13 -- no,</p> <p>11 number 12. Yeah, because there's this house -- yeah,</p> <p>12 number 12.</p> <p>13 Q. I think you're correct. So I'm going to go</p> <p>14 ahead and help. And let's -- I'm just going to kind of</p> <p>15 put a red box around that.</p> <p>16 So that's the location of your property</p> <p>17 within Nottingham Forest Section 8?</p> <p>18 A. Yes.</p> <p>19 Q. Very good. Were there other features of -- of</p> <p>20 the neighborhood? You talked about the school district,</p> <p>21 the -- the look of the house. Were there any other</p> <p>22 features of Nottingham Forest Section 8 that influenced</p> <p>23 your decision to buy the home here?</p> <p>24 A. Just a very nice part of West Houston.</p> <p>25 Q. At the time you purchased, were you aware of</p>

John Britton

July 16, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE: UPSTREAM ADDICKS)

AND BARKER (TEXAS))

3 FLOOD-CONTROL RESERVOIRS)

4) CASE NO. 17-cv-9002L

5 THIS DOCUMENT RELATES TO:)

6 ALL DOWNSTREAM CASES)

7
8 ORAL DEPOSITION

9 JOHN BRITTON

10 30(B)(6) MEMORIAL SMC INVESTMENT 2013, LP

11 JOHN BRITTON

12
13 ORAL 30(b)(6) DEPOSITION OF JOHN BRITTON,
14 Memorial SMC Investment 2013, LP, produced as a
15 witness at the instance of the JOHN BRITTON and duly
16 sworn, was taken in the above-styled and numbered
17 cause on the 16th day of July, 2018, from 9:10 a.m.
18 to 2:19 p.m., before Shauna Foreman, Certified
19 Shorthand Reporter in and for the State of Texas,
20 reported by computerized stenotype machine at the
21 offices of Vinson & Elkins, 1001 Fannin, Suite 2500,
22 Houston, Texas, pursuant to the Federal Rules of
23 Civil Procedure and the provisions stated on the
24 record or attached hereto.
25

John Britton

July 16, 2018

Page 22

1 status of construction. I believe some of the
2 partners may have gotten monthly construction draws.
3 We would make those available if they wanted them,
4 but a lot of the partners don't want that much
5 detailed information.

6 Once the property is up and running,
7 then we have monthly operating reports prepared by
8 our management company. And again, those are
9 supplied to the limited partners who ask for them. I
10 think annually we -- we provide -- under the limited
11 partnership agreement, we're obligated to provide
12 annual reports, but we typically -- if a partner
13 wants more often than annually, we'll provide them
14 whatever they want.

15 Q. And prior to the formation or the -- prior
16 to the participation in the limited partnership by
17 these various limited partners, were materials
18 provided to those entities associated with their
19 potential investment?

20 A. Yes.

21 Q. What was provided?

22 A. An underwriting analysis prepared by Grayco
23 Partners that looked at the development budget -- we
24 prepared a development budget -- and a projection of
25 operations, probably a 48-month or 84-month

Page 23

1 projection of financial operations.

2 Q. After the formation, did Memorial SMC
3 continue to provide projection of operations to the
4 various investors?

5 A. No. When we started construction, we
6 provided construction-related information to the
7 partners, but we don't go in and reanalyze the
8 operations before we even start operations.

9 Q. And then at some -- at any point in time --
10 on an annual basis -- was there ever any reports that
11 provided projections that talked about maybe the
12 Houston market, how it's developed, what's different,
13 what's the same?

14 A. The management company would prepare an
15 annual operating budget for the property.

16 Q. From 2013 through December of 2017, is it
17 fair to characterize Memorial SMC 2013 as a passive
18 participant in this project, in the Parkside project?

19 MR. McNEIL: Objection. Form.

20 A. Can you repeat that?

21 Q. (BY MR. DAIN) I'm trying to find out
22 what -- they didn't have any employees. You
23 mentioned that Memorial SMC didn't have any
24 employees, correct?

25 A. Correct.

Page 24

1 Q. What activities did Memorial SMC carry out
2 itself from 2013 through 2017?

3 A. I'm not sure I fully understand the
4 question. Memorial SMC is an ownership entity that
5 is sponsored by Grayco Partners. Grayco Partners had
6 the obligation -- the development obligation -- I
7 can't remember if there's a development agreement or
8 if the obligation of development is built into the
9 limited partnership agreement.

10 So the day-to-day operations fell to
11 Grayco Partners, who in turn engaged Grayco Builders
12 for the construction aspect. And Grayco Partners and
13 Grayco Builders both have employees.

14 Q. And did Grayco Management have any role
15 prior to occupancy beginning?

16 A. They have a limited role. When we are
17 working on a development and coming up with
18 the -- the backhouse operation, the leasing office
19 and how things are going to flow, we will consult
20 with them. The management company itself is engaged
21 probably three months prior to initial leasing or
22 initial opening.

23 Q. All right. Then let me step back and talk
24 about the history of the Parkside project itself,
25 because the Parkside project existed before Memorial

Page 25

1 SMC Investment was created, correct?

2 A. No.

3 Q. Okay. When was there an interest -- an
4 interest explored in the possibility of developing at
5 Parkside?

6 A. Late 2011 and early 2012.

7 Q. Okay. And who was involved in that from --
8 from Grayco Partners' perspective?

9 A. Myself and Jeff Gray.

10 Q. And I'm unfamiliar with what was at that
11 property prior to the present apartment complex. So
12 what was at that property in 2011?

13 A. There was an older office building. I
14 believe it was the former headquarters for Amoco, but
15 I'm not 100 percent sure of that. But it was an
16 older office building that was located on a 21 or
17 so-acre parcel. That 21-acre parcel ultimately was
18 split into two parcels. The back approximate 9 acres
19 Memorial SMC ended up purchasing, and the front was
20 purchased from -- by an entity controlled by Skanska,
21 which is a construction company -- U.S. operations
22 based in New York, but it's an international
23 construction company.

24 Q. And I saw the name of Skanska in some of
25 the documents, and I -- I wasn't clear on their role.

7 (Pages 22 - 25)

John Britton

July 16, 2018

Page 26	Page 28
<p>1 Do they have -- other than the fact that they -- did</p> <p>2 they buy their parcel at the same time that -- well,</p> <p>3 strike that. In 2000 -- let me just go back to my</p> <p>4 timeline so I don't -- I don't lose my track there.</p> <p>5 So in 2011, yourself and Jeff Gray</p> <p>6 were involved. There was the former headquarter --</p> <p>7 potentially the former headquarters for Amoco that</p> <p>8 eventually resulted in the acquisition of an</p> <p>9 approximately 9-acre parcel that is the location of</p> <p>10 the Parkside apartment complex today; is that</p> <p>11 correct?</p> <p>12 A. That is correct.</p> <p>13 Q. And when did that acquisition happen?</p> <p>14 A. The acquisition didn't close until August</p> <p>15 of 2013.</p> <p>16 Q. And did it close at the same time the</p> <p>17 Skanska property closed?</p> <p>18 A. Technically, Skanska purchased the property</p> <p>19 and we purchased the property from Skanska.</p> <p>20 Q. Okay.</p> <p>21 A. And Skanska closed on the acquisition well</p> <p>22 before 2013.</p> <p>23 Q. So you purchased from Skanska?</p> <p>24 A. Technically, we purchased from Skanska.</p> <p>25 Q. Prior to that, had there already been a</p>	<p>1 property jointly with Skanska. They wanted the front</p> <p>2 half to use to develop a pair of office buildings.</p> <p>3 We were interested in the back half which abutted the</p> <p>4 Terry Hershey Park and would be a -- what we felt a</p> <p>5 fantastic apartment location.</p> <p>6 Our analysis of the property consisted</p> <p>7 of -- of location, looking at market comparables,</p> <p>8 looking at the physical aspects of the property, and</p> <p>9 trying to determine if it was satisfactory for an</p> <p>10 apartment development.</p> <p>11 Q. And this work between 2011 and 2013 would</p> <p>12 have all been performed by Grayco Partners; is that</p> <p>13 correct?</p> <p>14 A. Yes. Grayco Partners typically on the</p> <p>15 front end of developments as the development company</p> <p>16 will perform all the analysis and contract for the</p> <p>17 properties in its name. Those purchase contracts</p> <p>18 typically have an assignment provision where Grayco</p> <p>19 can assign it to a related entity.</p> <p>20 So we don't move the property into the</p> <p>21 actual owner until the very end when we close. So</p> <p>22 all the pre-development activities are taken --</p> <p>23 undertaken by Grayco Partners.</p> <p>24 Q. What was the purchase price of the</p> <p>25 property?</p>
Page 27	Page 29
<p>1 legal commitment for that acquisition from Skanska?</p> <p>2 A. Yes. We began working with Skanska to</p> <p>3 acquire this property. They wanted the front. We</p> <p>4 wanted the back. We worked in conjunction with</p> <p>5 Skanska, agreed to let Skanska sort of drive the car.</p> <p>6 They were the direct purchaser of the property. We</p> <p>7 were working in the background with Skanska.</p> <p>8 Something happened along the way. Skanska ended up</p> <p>9 not wanting to close with Grayco, and litigation</p> <p>10 commenced.</p> <p>11 Q. And when did the litigation occur?</p> <p>12 A. Late 2012, I believe.</p> <p>13 Q. That resulted in a settlement of that</p> <p>14 litigation?</p> <p>15 A. Yes.</p> <p>16 Q. And as part of that settlement agreement,</p> <p>17 did they agree to convey the 9-acre lot?</p> <p>18 A. They did.</p> <p>19 Q. From the perspective of exploring the</p> <p>20 development, you mentioned the efforts on behalf of</p> <p>21 Grayco began in late 2011.</p> <p>22 Can you just walk me through what</p> <p>23 steps were taken as far as investigating this</p> <p>24 potential development starting in late 2011?</p> <p>25 A. Sure. So we -- again, we're looking at the</p>	<p>1 A. It was around \$9 million, but I would</p> <p>2 rather not speculate. I think we've given you the</p> <p>3 purchase and sale agreement. Can we take a look at</p> <p>4 that to confirm the number?</p> <p>5 Q. I don't know if I've seen the purchase and</p> <p>6 sale agreement between Grayco Partners and Skanska.</p> <p>7 MS. MILNER: We've produced it.</p> <p>8 MR. DAIN: Is it in a special warranty</p> <p>9 deed, or is it a separate document?</p> <p>10 MS. MILNER: It's a separate document.</p> <p>11 Give me just one second.</p> <p>12 A. I'm sorry. Well, the original contract was</p> <p>13 \$7,912,000.</p> <p>14 MR. McNEIL: David, he's looking at a</p> <p>15 copy of the purchase and sale contract between SCD</p> <p>16 Acquisitions, LLC and Grayco Partners, LLC. It's</p> <p>17 dated December 30th, 2011.</p> <p>18 MR. DAIN: And is there a Bates stamp</p> <p>19 on that?</p> <p>20 MS. MILNER: I didn't print any of</p> <p>21 those with Bates stamp numbers on them for our prep.</p> <p>22 Do you want to just use his copy?</p> <p>23 MR. McNEIL: There is -- no. This is</p> <p>24 just -- he -- these are documents that he reviewed to</p> <p>25 prepare for the deposition.</p>

8 (Pages 26 - 29)

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 VIRGINIA MILTON
10 JULY 10, 2018
11 -----

12 ORAL DEPOSITION OF VIRGINIA MILTON, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 10th day of July, 2018, from 3:14 p.m. to
16 5:00 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 Thank you.

2 A. Okay.

3 Q. You were in the room for the latter part of
4 Mr. Milton's deposition. Is there anything you want to
5 correct that Mr. Milton said?

6 A. I don't think correct. I think because he
7 didn't know about Mrs. Kickerillo, that she is remarried
8 to another Italian. She is no longer married to
9 Vincent Kickerillo.

10 Q. Was that the only thing?

11 A. Yes.

12 Q. Is it -- what's the address of the home which
13 is at issue in this matter?

14 A. 850 Silvergate Drive, 77079, Houston, Texas.

15 MR. HOBBS: I'm going to object to the form
16 of that question too.

17 Q. (BY MR. LEVINE) What year did you and your
18 husband purchase that home?

19 A. 1978.

20 Q. And you purchased it together?

21 A. Yes.

22 Q. How long have you and Mr. Milton been married?

23 A. 53 years.

24 Q. Congratulations.

25 A. Thank you.

THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE: DOWNSTREAM ADDICKS)
AND BARKER (TEXAS))
FLOOD-CONTROL RESERVOIRS)
) SUB-MASTER DOCKET NO.
) 17-CV-90021
)

ORAL DEPOSITION OF

JENNIFER SHIPOS

September 19, 2018

Volume 1

ORAL AND VIDEOTAPED DEPOSITION OF JENNIFER SHIPOS,
produced as a witness at the instance of the DEFENDANT,
was taken in the above-styled and numbered cause on
September 19, 2018 from 3:02 p.m. to 5:05 p.m., before
Toyloria Lanay Hunter, CSR in and for the State of
Texas, reported by machine shorthand, at the law offices
of NEEL, HOOPER & BANES, P.C., 1800 West Loop South,
Suite 1750, Houston, Texas 77027, pursuant to the
Federal Rules of Civil Procedure and the provisions
stated on the record or attached hereto.

1 A. BS.

2 Q. Do you have any graduate degrees?

3 A. No.

4 Q. I'm assuming in your training of finance, you
5 never received any kind of training in hydrology?

6 A. No.

7 Q. Have you ever worked for the government?

8 A. No.

9 Q. How long have you lived in Houston?

10 A. Since '93.

11 Q. And you live at 931 Bayou Parkway?

12 A. Since '96.

13 Q. Does anyone else live with you?

14 A. Yes, my daughter.

15 Q. Okay. And how old is she?

16 A. She is 17. And I have a son that's in
17 college.

18 Q. He doesn't live at home?

19 A. Not permanent -- I mean, he lives with me; but
20 not on a regular basis.

21 Q. Where does he go to school?

22 A. UT.

23 Q. I'm sorry. How old is he?

24 A. He's 20.

25 Q. I'd like to show you what we'll mark as

1 in order to have homeowners association -- or no. I
2 mean -- we just never were required. I think some areas
3 are required.

4 Q. When you -- since you've owned it, have you
5 ever had flood insurance?

6 A. Two years now.

7 Q. And so when did you first have flood
8 insurance?

9 A. Well, I guess I just renewed it for the third
10 time in July. So it would have been, let's see. Maybe
11 July of 2016.

12 Q. What company is that with?

13 A. Allstate.

14 Q. When you bought it in 2016, why did you buy
15 it?

16 A. Well, I'd never had any kind of water. Like,
17 we went through Allison. We went through Ike. Never
18 had a problem at all. The tax flood day, it did come up
19 in the yard. And that was probably -- you know. To the
20 extent -- you know, that I had seen water, you know, it
21 was enough where we couldn't pull our cars in.

22 So -- but then it went right back out. So
23 that was the first time I thought maybe this would be a
24 good idea. But we do live in Houston, so. . .

25 Q. How much do you pay for flood insurance?

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF

9 ZHENNIA SILVERMAN

10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF ZHENNIA SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 4:05 p.m. to
16 5:34 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.
23
24
25

1 Peter Silverman, right?

2 A. Right.

3 Q. And I think your husband testified that you
4 moved into the house on 12515 Westerley Lane in 1990?

5 A. That would -- that sounds about right.

6 Q. Okay.

7 A. It was a couple of months before we got
8 married.

9 Q. Okay. Did you live anywhere between the
10 apartment on 18th Street and --

11 A. Yes. We -- I moved in with my husband and we
12 lived at Waterford Square Apartments on Alabama.

13 Q. Okay. Okay. And then after -- and have you
14 lived in Houston then since the mid-'80s other than that
15 time that you were abroad with your husband?

16 A. That is correct.

17 Q. And how much of that time -- because I believe
18 your husband testified that he was abroad between, say,
19 1992 and 1995. Were you there with him for all of that
20 time?

21 A. Almost all of that time.

22 Q. Okay.

23 A. He did have some assignments like to work in
24 the Philippines or to work in China where I did not
25 accompany him.

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM)
ADDICKS AND BARKER) Sub-Master Docket
(TEXAS) FLOOD-CONTROL) No. 17-cv-9002L
RESERVOIRS)

ORAL DEPOSITION OF
TIMOTHY STAHL
SEPTEMBER 5, 2018

ORAL DEPOSITION of TIMOTHY STAHL, produced as a witness at the instance of the Defendant, and duly sworn, was taken in the above-styled and numbered cause on September 5, 2018, from 10:10 a.m. to 2:52 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of NEEL, HOOPER & BANES, P.C., 1800 West Loop South, Suite 1750, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

1 So, Mr. Stahl, how long have you lived in the
2 Houston area?

3 A. I was born here in 1976.

4 Q. Okay. And what area of Houston did you grow
5 up in?

6 A. Until my parents' divorce, right down the
7 street from this house.

8 Q. So along either Buffalo Bayou or Spring
9 Branch?

10 A. Spring Branch, yes.

11 Q. Okay. And when did you move away from this
12 Spring Branch area?

13 A. I think it was 1986. My mom and dad had a
14 divorce. In '88 or so, I went to live with my dad on
15 the south side of town. I was there until I was 17
16 and I finished high school and I went in the Army and
17 then I was gone until I was 21. I lived on the south
18 side for a little while and then went to flight school
19 in Oklahoma and ended up in multiple different parts
20 of the country and then I was back here approximately
21 11 or 12 years ago.

22 Q. Okay.

23 A. About 2007-ish.

24 Q. Okay. And you purchased the home on Chimney
25 Rock Road in October, 2007; is that correct?

1 A. That is correct, yes, ma'am.

2 Q. So during -- during the years that you grew
3 up along Spring -- in the Spring Branch area, did you
4 live in a house that directly abutted that Spring
5 Branch corridor?

6 A. No, ma'am.

7 Q. How -- how close were you to Spring Branch?

8 A. Well, at the time there -- you're talking
9 about Spring Branch, the creek, or Spring Branch, the
10 neighborhood.

11 Q. I'm talking about the creek.

12 A. Okay. I think there was a tributary or
13 something that we just called a ditch, a deep ditch,
14 that was across the street, but they've now put that
15 underground?

16 Q. During the time you were growing up in that
17 area, did the home that you lived in experience any
18 flooding?

19 A. No, ma'am, not even during Hurricane Alicia.

20 Q. So you remember Hurricane Alicia?

21 A. I do.

22 Q. Was there any flooding in the streets in your
23 neighborhood during that hurricane?

24 A. No, ma'am.

25 Q. So going back to October, 2007, when you

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE: DOWNSTREAM §

ADDICKS AND BARKER (TEXAS) §

FLOOD-CONTROL RESERVOIRS §

vs. § SUB-MASTER DOCKET NO.

§ 17-cv-9002L

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

§

ORAL DEPOSITION

MR. SHAWN S. WELLING

August 14, 2018

ORAL DEPOSITION OF MR. SHAWN S. WELLING,
produced as a witness at the instance of the United
States and duly sworn, was taken in the above-styled
and numbered cause on the 14th day of August, 2018,
from 9:22 a.m. to 3:52 p.m., before Michelle Hartman,
Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Potts Law Firm, 3737 Buffalo Speedway, Suite 1900,
Houston, Texas 77098, pursuant to the Federal Rules
of Civil Procedure and the provisions stated on the
record or attached hereto.

<p style="text-align: right;">Page 30</p> <p>1 to your acquisition, but I don't say that to suggest 2 an answer. I'm just saying: Would you please 3 describe for me the history of the test property. 4 A. The test property refers to 5731 Logan 5 Lane? 6 Q. Yes. 7 A. Okay. That was -- I purchased that 8 independent of my family. 9 Q. What year? 10 A. I think it was 2000. 11 Q. Who owned it before then? 12 A. Simone Bateman. 13 Q. Who is Simone Bateman? 14 A. She was a neighborhood friend and -- 15 with everybody. I grew up on that street, if that 16 means anything, all my life. Except for my time in 17 U.T. 18 Q. Okay. 19 A. It was -- well, I mean, I will let you 20 ask more questions instead of -- 21 Q. Tell me about how you came to acquire 22 that property from Ms. Bateman. 23 A. I wanted to open a dance studio, and I 24 think part of the concept was it would be good to be 25 in the neighborhood of the property that was part and</p>	<p style="text-align: right;">Page 32</p> <p>1 What was that property like in 2000? 2 I know there's been additions over time. One of the 3 things I wanted to walk forward is how that property 4 has changed since you initially purchased it. 5 A. Pretty dramatically. 6 Q. So what was it in 2000? Physically 7 what was that property like? 8 A. It was a two-bedroom, one-bath, very 9 old home, but had a lot of character to it; had a 10 nice red brick fireplace; and certainly a wonderful 11 part of the neighborhood, corner lot. 12 Q. And -- 13 (Phone rings) 14 THE WITNESS: Excuse me. I have to 15 get this real quick. 16 MR. SALISBURY: Can we take a break? 17 MR. DAIN: Off the record. 18 (Recess taken) 19 (The record was read as requested) 20 Q. (BY MR. DAIN) And when you purchased 21 it, did you live there? 22 A. Uh-huh. Yes. I am getting the hang of 23 this. 24 Q. So let me -- I will first walk through 25 the use of the property, and then I will go back an</p>
<p style="text-align: right;">Page 31</p> <p>1 parcel mostly to the family. We had a lot of 2 property in that area, close to maybe 15 acres. 3 Q. And so did you approach Ms. Bateman 4 and -- 5 A. Uh-huh. 6 Q. -- inquire about whether she was 7 willing to sell to you? 8 A. She was growing very old and her health 9 wasn't to par, and a lot of development was occurring 10 around that house. She didn't want her house to be 11 torn down. And every piece of property that was 12 being purchased was being torn down and made into 13 half-dollar (sic) townhomes, very nice townhomes were 14 being replaced. And I promised her, upon her 15 request, that I wouldn't tear her house down and put 16 up a townhome, so -- 17 Q. How much did you pay for it? 18 A. 385. At least I feel it is a good 19 price. 20 Q. And was your agreement to not tear it 21 down in writing? 22 A. Huh-uh. 23 Q. Oral? 24 A. No. Sorry, no. 25 Q. That's okay.</p>	<p style="text-align: right;">Page 33</p> <p>1 maybe walk through the -- 2 A. Okay. 3 Q. -- physical changes to the property. 4 Could you describe for me the use that 5 the property went through starting in 2000 and bring 6 it current. 7 A. Sure. It was divided into two 8 different uses: Living quarters for myself as a 9 single man; then there was a commercial use as well 10 for a dance studio. 11 Q. And that began in 2000? 12 A. We had the initial construction in 13 which the living quarters was maintained. The same 14 house structure, that didn't change. 15 And then the addition was the dance 16 studio, which was on the side yard and the front 17 patio area of the original house. 18 Q. Okay. And has that dual use continued 19 from 2000 to the present? 20 A. It then went to a office, dance studio 21 use, and then I moved back and now I am living there. 22 Q. Approximately when did you move out? 23 A. 2000 and -- let's see, I bought that 24 house on a loan, that spot, 2005. 25 Q. And when did you move back?</p>

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE UPSTREAM ADDICKS

AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIRS Sub-Master Docket No.

17-cv-9001L

Judge Charles F. Lettow

THIS DOCUMENT RELATES TO:
ALL UPSTREAM CASES

ORAL DEPOSITION OF VAL ALDRED

AUGUST 1, 2018

ORAL DEPOSITION OF VAL ALDRED, produced as a witness at the instance of the Defendant and duly sworn, was taken in the above styled and numbered cause on Wednesday, August 1, 2018, from 8:58 a.m. to 3:31 p.m., before Rene White Moarefi, CSR, CRR, RPR in and for the State of Texas, reported by computerized stenotype machine, at the offices of Potts Law Firm, 3737 Buffalo Speedway, Suite 1900, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and any provisions stated on the record herein.

<p style="text-align: right;">Page 22</p> <p>1 where we wanted to live, and so that's the one I 2 ended up buying. 3 Q. Why did you want to live in the Spring 4 Branch Independent School District? 5 A. The schools come highly acclaimed. 6 Q. Any other reasons? 7 A. Well, we -- I'm from the west part of 8 Houston, so I naturally felt comfortable living in 9 West Houston. 10 Q. You mentioned that you were staying with 11 your mom while you were looking for a home. Where 12 does she live? 13 A. She's passed way now, but she was living 14 at the time on Bering Drive right there at the 15 intersection of Bering and Woodway. 16 Q. Okay. And is that where you grew up? 17 A. No, I grew up in -- well, let's see. I 18 grew up originally -- born -- my first five years, I 19 was -- I lived in a house off Wesleyan and 20 Richmond -- is that right -- which is now the movie 21 theater that has been built over it. But I lived on 22 San Felipe and Briargrove for, gosh, five or six 23 years. And then I lived at -- in Tanglewood, I 24 guess, on Riverview Way just north of Woodway and 25 west of -- of Bering Drive -- is it Bering? I think</p>	<p style="text-align: right;">Page 24</p> <p>1 have? 2 A. It has four bedrooms and two baths. 3 Q. Okay. And do you know what I mean when I 4 refer to the home located at 835 Thornvine as the 5 Thornvine home? 6 A. Yes. 7 Q. Okay. 8 A. Yes. 9 Q. Okay. Was flooding or proximity -- or 10 sorry -- or propensity to flood a consideration when 11 you purchased your home? 12 A. No. 13 Q. Why not? 14 A. Nobody made me aware of it. 15 Q. Your real estate agent didn't mention 16 flooding? 17 A. It's been 20 years ago. If she had, I 18 certainly would have taken notice of it. 19 Q. Did your mom mention flooding at all or 20 the possibility of flooding? 21 A. No. I mean, we -- we live in Houston. 22 It rains a lot but, you know, nothing to . . . 23 Q. Growing up, did you ever know anyone who 24 flooded? 25 A. No.</p>
<p style="text-align: right;">Page 23</p> <p>1 it's east of Bering, west of Chimney Rock. 2 Q. Did you look at any other neighborhoods? 3 A. You mean when I moved back here? 4 Q. Right. 5 A. I did. We -- we -- you know, I looked at 6 neighborhoods all the way up to east side of the 7 beltway and -- but not further east than maybe 8 Gessner at the time. 9 Q. Is there a reason you didn't look 10 farther -- further east? 11 A. Price. 12 Q. The homes east of the beltway were more 13 expensive? 14 A. I believe they were at the time, yeah. 15 Q. How many kids did you have at the time? 16 A. Three. 17 Q. Was proximity to downtown a 18 consideration? 19 A. No. 20 Q. Other than schools and your familiarity 21 with the neighborhood, were there any other 22 considerations when you purchased your home? 23 A. Did it have enough rooms to support a 24 family of five. 25 Q. And how many rooms did the Thornvine home</p>	<p style="text-align: right;">Page 25</p> <p>1 Q. Did you talk to the prior owners 2 beforehand? 3 A. I did. I saw them maybe -- maybe once 4 when we were visiting the house. But that's kind of 5 more just -- just chitchat more than anything else, 6 you know. 7 Q. Did you ever ask them about flooding? 8 A. Nope. 9 (Exhibit 4 marked.) 10 BY MS. IZFAR: 11 Q. I'm going to show you a document that 12 I've marked as Exhibit 4. Take a look at it and let 13 me know if this is an accurate reflection, to the 14 best of your recollection, of the listing of your 15 home in 1997. 16 A. Glad to know that I remember I got the 17 Greenwood King Properties correct. Let's see. 18 Looks to be pretty much the way I remembered it. 19 Q. Okay. I want to direct your attention to 20 the top of the listing. The lot size is listed as 21 8,970 square feet. Does that sound about right to 22 you? 23 A. I have no idea. I'm not -- 24 Q. Okay. 25 A. I'm not a -- I just never -- I never</p>

<p style="text-align: right;">Page 26</p> <p>1 measured it off. I've got to believe that they 2 would represent it correctly and not try to defraud 3 me or anything. 4 Q. Right. Okay. At the bottom, I want to 5 direct your attention to the sold information. 6 A. Wait. Okay. I'm sorry. Gotcha. Okay. 7 Q. The sales price was listed as -- is 8 listed as 214,000. Does that comport with your 9 recollection of how much you paid for the home? 10 A. That's probably -- yeah, that's probably 11 right. I mean, I knew it was around -- somewhere 12 between 210 and 215. I didn't remember exactly, but 13 that's -- that's reasonable. 14 Q. And it also notes that a loan of 160,000 15 was taken out. Does that sound about right? 16 A. It -- I believe so. 17 Q. Okay. So you put down as a down payment 18 about \$54,000? 19 A. If the math is correct, that's -- be 20 correct. 21 Q. Okay. Do you still have a mortgage on 22 your home? 23 A. No. 24 Q. When did you pay that off? 25 A. Let's see. I believe it would have been</p>	<p style="text-align: right;">Page 28</p> <p>1 BY MS. IZFAR: 2 Q. This is a printout -- or I'll represent 3 to you this is a printout from the Harris County 4 Appraisal District. I typed in your address and 5 this is the information that was provided. 6 Again, the appraisal district lists your 7 land area as 8,970 square feet. Do you have any 8 reason to believe that this is inaccurate? 9 A. No. No. 10 Q. Okay. And the total living area is 11 listed as 3,095 square feet. Does that sound about 12 right to you? 13 A. It does. 14 Q. Okay. The legal description at the top 15 is the -- is Lot 24, Block 1 of Thornwood, 16 Section 4. What's Thornwood? 17 A. Thornwood is the neighborhood that I live 18 in. 19 Q. Are you part of an HOA? 20 A. Yes. 21 Q. Okay. What does your HOA do for you? 22 A. They contract for the security for the 23 garbage pick-up and lawn care around the entryway. 24 And for the most part, there's probably a number of 25 other things. Oh, they maintain the swimming pools.</p>
<p style="text-align: right;">Page 27</p> <p>1 sometime in about 2011. 2 Q. Congratulations. 3 A. Thank you. 4 MR. SALISBURY: Why did you pay off a 5 loan with a 0 percent interest rate? 6 THE WITNESS: Well, this wasn't 7 0 percent interest in this -- the loan that I had at 8 the time after I refinanced it was probably maybe 9 7 percent or somewhere thereabouts. We had 10 ratcheted down as interest rates came down. 11 Yeah, that would have been crazy to 12 have done that. I paid it off because I had -- you 13 know, my dad had given me some life insurance when 14 he passed away that I used to pay it off. 15 BY MS. IZFAR: 16 Q. All right. No, we can put this aside for 17 now. 18 A. Okay. 19 Q. You can keep the exhibits by you, because 20 I might refer to them later on. 21 A. Okay. 22 Q. I want to introduce you -- I want to show 23 you another document that I'm going to mark as 24 Exhibit 5. 25 (Exhibit 5 marked.)</p>	<p style="text-align: right;">Page 29</p> <p>1 Q. Do they maintain any drainage? 2 A. In what way? 3 Q. Have they installed any drainage 4 infrastructure on your streets? 5 A. I don't know what they have. It has been 6 done, but I don't know that they -- that they did it 7 necessarily. 8 Q. Okay. Are there any detention ponds in 9 your neighborhood? 10 A. No. 11 Q. Okay. So looking back on -- I believe 12 it's Exhibit 5, do you see a table that's listed as 13 exemptions and jurisdictions? 14 A. Yes. 15 Q. And then there is a list of 16 jurisdictions, Spring Branch ISD, Harris County, 17 Harris County Flood Control, Port of Houston 18 Authority, Harris County Hospital District, Harris 19 County education district, and City of Houston. Do 20 you pay taxes to all of these jurisdictions? 21 A. I do. 22 Q. Okay. Do you recall receiving any 23 disclosures when you purchased your home concerning 24 flooding? 25 A. What do you mean by "disclosures"?</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 PHILLIP AZAR

9
 JULY 9, 2018
10 -----

11
12 ORAL DEPOSITION OF PHILLIP AZAR, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 9th day of July, 2018, from 9:02 a.m. to
16 5:03 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Kirby
18 Mansion, 2000 Smith Street, Suite 550, Houston, Texas
19 77002, pursuant to the Federal Rules of Civil Procedure
20 and the provisions stated on the record or attached
21 hereto; that the deposition shall be read and signed
22 before any notary public.

1 the whole bayou, a good part of it right there. And a
2 wide part, a skinny part or something, whatever they
3 wanted to see, they liked it there.

4 So I said, "Just put a camera there. That
5 way you guys can observe that where you're at. You'll
6 know when it's up or down." And I don't know whether
7 that camera was there during Harvey or not.

8 Q. Knowing what you know now about how those dams
9 and reservoirs work, do you think that they have
10 protected your home during storm events in the past?

11 MR. ROBERTS: Objection; calls for
12 speculation.

13 A. Well, this will probably go both ways, but my
14 real answer would be I would never move in there if I
15 thought this would have happened, number one. Number
16 two, I remember talking to Bobby Deden, the hydrologist
17 that we mentioned, Bobby, D-E-D-E-N.

18 And I said, "Bobby, I thought you said this
19 would probably never flood." And this was back in, I
20 want to say, '92, a couple years, maybe '94, whatever
21 that flood was after. And they had 18-wheelers floating
22 down I-10. And I found out later from talking to Bobby
23 the reason that that flood happened is because -- that's
24 the first time I ever heard about it -- was because the
25 people that were supposed to be going down to the dam,

DEPOSITION OF JANA CANAN BEYOGLU

DEPOSITION AND ANSWERS of JANA CANAN BEYOGLU, taken before Edith A. Boggs, a certified shorthand reporter in Harris County for the State of Texas, taken at the law offices of Neel, Hooper & Banes, PC, 1800 West Loop South, Suite 1750, Houston, Texas, on the 18th day of September, 2018, between the hours of 1:49 p.m. and 5:06 p.m.

1 Q. And during -- from 2005 when you bought it
2 until when you sold it, only you and your husband owned
3 the property; is that right?

4 A. That's correct.

5 Q. Do you recall if they were -- well, what kind
6 of documents did you receive when you purchased the
7 house in 2005?

8 A. I don't know. I don't remember.

9 Q. Do you remember getting disclosures of the
10 house?

11 A. I'm sure we did.

12 Q. Okay. Do you remember if they disclosed any
13 issues with let's say plumbing?

14 A. No, I don't recall.

15 Q. Or termite -- issues with like termites?

16 A. When we were buying it, no.

17 Q. What about anything about flooding?

18 A. No.

19 Q. So, as far as you know, the property had never
20 flooded when you purchased it?

21 A. No.

22 Q. Okay. And your Maplewood house where you
23 lived, did that house ever flood?

24 A. No.

25 Q. Prior to Maplewood, you lived somewhere else.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO)
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 DANA CUTTS

9
 JUNE 27, 2018
10 -----

11
12 ORAL DEPOSITION OF DANA CUTTS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 27th day of June, 2018, from 9:07 a.m. to
16 2:55 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at the
18 offices of McGehee, Chang, Landgraf, 10370 Richmond
19 Avenue, Suite 1300, Houston, Texas 77042, pursuant to
20 the Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.

1 A. Just what I saw on the news, that the
2 reservoirs were filling and they were going to have some
3 controlled releases.

4 Q. Okay. And have you received any information
5 from local governments about the reservoirs after
6 Hurricane Harvey?

7 A. Other than what I read in the news that water
8 would be -- was being released for probably several
9 months, no.

10 Q. Okay. Have you ever received information from
11 local governments about Houston being a flood-prone
12 area?

13 A. Well, just what I've seen over the years when
14 they've talked about heavy rains and different parts of
15 Houston flooding like Meyerland, which seems to flood
16 quite a bit. But just that general kind of thing.

17 Q. Has -- do you have knowledge of whether your
18 property has ever flooded?

19 A. Yes, I do have knowledge.

20 Q. Okay. And what is that knowledge?

21 A. It has never flooded.

22 Q. Okay. Do you have knowledge about whether your
23 property has flooded before the time you owned it?

24 A. No, I do not.

25 Q. Okay.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE DOWNSTREAM : Sub-Master Docket

3 ADDICKS AND BARKER : No. 17-cv-9002L

(TEXAS) FLOOD-CONTROL :

4 RESERVOIRS : Judge Susan G.

: Braden

5 :

THIS DOCUMENT RELATES :

6 TO: :

ALL TEST PROPERTIES :

7
8 * * *

9 MONDAY, SEPTEMBER 17, 2018

10 * * *

11
12 Oral deposition of INGA GODEJORD taken
13 at the law offices of Neel, Hooper & Banes,
14 P.C. 1800 West Loop South, Suite 1750,
15 Houston, Texas, commencing at 1:01 p.m.
16 before Debbie Leonard, Registered Diplomat
17 Reporter, Certified Realtime Reporter.

18
19
20
21
22
23 * * *

1 Q. And when you were looking at
2 homes in the Houston area, did you have any
3 understanding of potential flood risks in
4 different areas of Houston?

5 A. No, not at all, nothing.

6 Q. And did potential for flooding
7 come up at all with regard to your
8 consideration of the property that you
9 purchased?

10 A. No.

11 Q. Had you looked into whether the
12 property had flooded before, before you made
13 the purchase?

14 A. No. But, actually -- no, not
15 before.

16 Q. And before you made the
17 purchase of the property, had you ever heard
18 of the Addicks Reservoir and the Barker
19 Reservoir?

20 A. (Moving head side to side.)

21 No.

22 Q. Could you say that --

23 A. No.

24 Q. -- for the court reporter?

25 A. No.

1 Q. So since the time that you
2 started living in that house, have you ever
3 gone down and viewed the Buffalo Bayou?

4 A. I walked in the park. I saw
5 the bayou there, yeah.

6 Q. About how often do you walk in
7 the park or did -- how often did you used to
8 walk in the park before Hurricane Harvey?

9 A. Maybe couple times in a week.
10 Not in summers, though.

11 Q. So when you were looking at
12 neighborhoods with your real estate agent,
13 did you discuss with her any -- did you
14 discuss with her flooding -- potential
15 flooding risks of different neighborhoods?

16 A. We did discuss flooding in
17 Houston, but since she mentioned the people
18 there lived for so long, like, 30, 40, 50
19 years, so I guess we were aware that there
20 were no flooding. Same neighbors for many
21 years.

22 Q. And before Hurricane Harvey,
23 you had said that you walked along the park
24 by Buffalo Bayou a couple times a week?

25 A. I did.

IN THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE UPSTREAM ADDICKS §
AND BARKER (TEXAS) §
FLOOD-CONTROL RESERVOIRS § SUB-MASTER DOCKET

§ NO. 17-cv-9002L

____ §
§ Chief Judge Susan G. Braden

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

____ §

ORAL DEPOSITION

MR. JEREMY E. GOOD

July 19, 2018

ORAL DEPOSITION OF MR. JEREMY E. GOOD, produced
as a witness at the instance of the United States and
duly sworn, was taken in the above-styled and
numbered cause on the 19th day of July, 2018, from

a.m. to 12:23 p.m., before Michelle Hartman, 9:00
Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Raizner Slania, LLP, 2402 Dunlavy Street, Houston,
Texas 77006, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached hereto.

1 try to be there -- if there are no maintenance
2 issues, which there are inevitably, but I -- if there
3 are no maintenance issues, I try to get there at
4 least once a month.

5 Q. Prior to the purchase, were you
6 aware of -- aware of any flooding of any properties
7 on Memorial Mews Street?

8 A. No.

9 Q. Were you ever aware of any flooding of
10 any properties near your property?

11 A. No.

12 Q. Were you ever aware of any instance in
13 which the stream that runs through Terry Hershey Park
14 overflowed its banks?

15 A. No.

16 Q. Let's talk about the complex itself a
17 little bit. Just for the record, could you describe
18 the unit itself.

19 It was four units?

20 A. Correct. It is a single unit -- a
21 single being, rather, with four units. It is
22 approximately 3,400 square feet in total space. Each
23 unit is a two-bedroom/two-bathroom approximately 800
24 and -- a little over 800 square feet each.

25 Q. What was that number?

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 WAYNE HOLLIS
10 JULY 19, 2018
11 -----

12 ORAL DEPOSITION OF WAYNE HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 8:59 a.m. to
16 12:13 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.

<p style="text-align: right;">Page 18</p> <p>1 the -- the proximity of -- of your home and the 2 neighborhood to Buffalo Bayou? 3 A. Yes. 4 Q. And was that a factor in your decision to 5 purchase the home at all? 6 A. Well, from my understanding, the dams were 7 built to protect us, and we always relied on that 8 theory. 9 Q. And so you're aware of both the -- the Addicks 10 and Barker Reservoirs and dam at the time? 11 A. Very aware. 12 Q. Okay. And this question probably requires you 13 to take a guess. But about -- about how far is your -- 14 your parcel from kind of the -- the edge of the green 15 space where Buffalo Bayou is located? 16 A. We're probably about a quarter of a mile to a 17 third of a mile from the actual flow of the bayou. 18 Q. And does your neighborhood have -- well, let 19 me -- let me back up and ask a preliminary question. I 20 understand there is a -- a bike path that runs along the 21 bayou near your neighborhood; is that right? 22 A. That's correct. Greenbelt and a -- and a bike 23 trail. 24 Q. Okay. And does -- does your neighborhood 25 have -- have access to that -- that bike path?</p>	<p style="text-align: right;">Page 20</p> <p>1 space or the bike path at all? 2 A. No, I do not use any of it. 3 Q. All right. We'll set that -- this aside for 4 now, and we'll probably come back to it if we need it 5 for reference. 6 A. Okay. 7 Q. So at the time that you were looking at the 8 home and purchasing, were you using a real estate agent? 9 A. Yes. 10 Q. And did the real estate agent have any 11 discussions with you about flood risk for this property 12 at the time? 13 A. It had never flooded. 14 Q. It had never flooded before your purchase? 15 A. Correct. 16 Q. And you were told that by the real estate 17 agent? 18 A. Correct. 19 Q. Did the real estate agent disclose whether you 20 were in a -- in a flood zone? 21 A. Disclosed we were in the 500-year floodplain. 22 Q. And did you have an understanding at that time 23 as to what that meant? 24 A. Yes. 25 Q. And what was your understanding?</p>
<p style="text-align: right;">Page 19</p> <p>1 A. Yes. 2 Q. And how do you access it? 3 A. You access it by going down and crossing 4 Bramblewood and some access points at different streets 5 that dead end to that green space. 6 Q. So looking at the first page, for example, 7 would you go down Nottingham Oaks Trail and does that 8 provide you access to the green space? At the top of -- 9 A. No. You have to go down -- yeah, Nottingham 10 Oaks Trail. And there's an access there, and then 11 there's an access at Dairy Ashford. And then there's an 12 access that doesn't show on this map. Where River 13 Forest makes a turn to the north here, there's another 14 street that Carolcrest goes across and there's an access 15 there. 16 Q. So if you look at the second page of what we've 17 marked as your Deposition Exhibit 1, are those access 18 points shown on that map? 19 A. I can't see that. I actually can't see that. 20 But I can't read the name of the street, but... 21 Q. It is very small. 22 A. Yeah. But there's an access at five or six 23 different points there where the streets dead end into 24 the green space. 25 Q. And is that -- do you -- do you use the green</p>	<p style="text-align: right;">Page 21</p> <p>1 A. That we would not flood. 2 Q. And at the time you purchased your home, did 3 you have a mortgage on the home? 4 A. Yes, we did. 5 Q. Did your mortgage holder require that you 6 insure the home? 7 A. Yes. 8 Q. Did they also require that you have flood 9 insurance on the home? 10 A. I don't think they required, but we had it. 11 Q. And so did you purchase flood insurance from 12 the beginning? 13 A. Yes. 14 Q. And had -- did you maintain that flood 15 insurance -- 16 A. Well, maybe they required it. They did require 17 it. I think the mortgage company required flood 18 insurance, I think. I don't -- I don't truly recall. 19 Q. Have you maintained flood insurance on the 20 property since -- since you closed on it in January of 21 1984? 22 A. Yes, we have. 23 Q. Okay. And aside from the claim that you made 24 after Harvey, have you ever had to make another claim on 25 your flood insurance policy?</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
 ORAL DEPOSITION OF

8
 ARNOLD MILTON

9
 JULY 10, 2018
10 -----

11
12 ORAL DEPOSITION OF ARNOLD MILTON, produced as
13 a witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 10th day of July, 2018, from 9:02 a.m. to
16 2:48 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 Q. What else attracted you to this particular
2 home?

3 A. We liked it because it was fairly small and we
4 only had one daughter.

5 Q. Was the school district a factor in your
6 decision?

7 A. No. We knew we were going to Kinkaid.
8 Actually, we went to St. Francis with her first and then
9 on to Kinkaid. And both of those schools were just off
10 of Memorial. And when I went to work downtown I drove
11 right past them so it was easy to take the daughter to
12 school in the morning.

13 Q. Was there anything else about the home or the
14 neighborhood that was a factor in your decision?

15 A. Not really.

16 Q. Was flooding a concern for you when you were
17 purchasing the home?

18 A. No. We really didn't think about it. I was
19 aware of the dams, but there hadn't been any problem
20 that we were aware of out there, so...

21 The first few years we were in the house we
22 bought flood insurance religiously, and after about
23 38 years we tended to forget about it. And that's what
24 happened to us on the last one. We actually discussed
25 it and my wife almost did it and then we got busy and

1 forgot about it and we got caught.

2 Q. I'll come back to questions about the details
3 about the flood insurance.

4 Going back to the time of the purchase, you
5 said you were aware of the dams. Can you describe for
6 me what your level of awareness was?

7 A. Well, I knew they were big, long, earthen dams.
8 And I knew Loop 6 crossed Addicks to the north and
9 Westheimer went south of Barker Cypress. And, of
10 course, that dam was west of Highway 6, south of I-10
11 too. So I just knew they were large. And I can
12 remember my father saying years ago that Memorial
13 wouldn't have been developed without those dams.

14 Q. Do you recall approximately when your father
15 said that?

16 A. No. It was probably in the '50s.

17 Q. So when you were young?

18 A. Uh-huh.

19 Q. Do you think your father's correct?

20 A. Oh, yeah. If you've ever looked at the 1975
21 flood pictures of downtown Houston, you'd know.

22 Q. Going back to your awareness of the dams prior
23 to purchasing, did you know what their names were?

24 A. I guess I did. It seemed like I've known their
25 names forever. But I feel fairly certain I didn't know

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 VIRGINIA MILTON
10 JULY 10, 2018
11 -----

12 ORAL DEPOSITION OF VIRGINIA MILTON, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 10th day of July, 2018, from 3:14 p.m. to
16 5:00 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 Q. Prior to Hurricane Harvey, had the
2 850 Silvergate property ever flooded?

3 A. No. Not only had it not flooded, it never had
4 a drop of water from any thunderstorm, hurricane, or
5 tropical storm.

6 Q. Did it ever rain on your house during one of
7 those types of events?

8 A. Yes.

9 Q. But water never came onto your property from
10 some other source, is what you're saying?

11 MR. HOBBS: Objection; form.

12 A. We never had any water in our house from any
13 source.

14 Q. (BY MR. LEVINE) So you've never had any water
15 damage to your home from any storm?

16 A. No.

17 Q. Has your roof ever been damaged?

18 A. We've had a couple of leaks -- one in the
19 dining room area, one in the kitchen going into the
20 garage area, from a shingle that got blown off. And so
21 we had -- we didn't realize we had a leak and had the
22 roof fixed. Also, we have a lot of squirrels that are
23 on the roof that do damage. So we have had from that
24 also.

25 Q. You've had water damage from that?

THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE: DOWNSTREAM ADDICKS)
AND BARKER (TEXAS))
FLOOD-CONTROL RESERVOIRS)
) SUB-MASTER DOCKET NO.
) 17-CV-90021
)

ORAL DEPOSITION OF

JENNIFER SHIPOS

September 19, 2018

Volume 1

ORAL AND VIDEOTAPED DEPOSITION OF JENNIFER SHIPOS,
produced as a witness at the instance of the DEFENDANT,
was taken in the above-styled and numbered cause on
September 19, 2018 from 3:02 p.m. to 5:05 p.m., before
Toyloria Lanay Hunter, CSR in and for the State of
Texas, reported by machine shorthand, at the law offices
of NEEL, HOOPER & BANES, P.C., 1800 West Loop South,
Suite 1750, Houston, Texas 77027, pursuant to the
Federal Rules of Civil Procedure and the provisions
stated on the record or attached hereto.

1 in order to have homeowners association -- or no. I
2 mean -- we just never were required. I think some areas
3 are required.

4 Q. When you -- since you've owned it, have you
5 ever had flood insurance?

6 A. Two years now.

7 Q. And so when did you first have flood
8 insurance?

9 A. Well, I guess I just renewed it for the third
10 time in July. So it would have been, let's see. Maybe
11 July of 2016.

12 Q. What company is that with?

13 A. Allstate.

14 Q. When you bought it in 2016, why did you buy
15 it?

16 A. Well, I'd never had any kind of water. Like,
17 we went through Allison. We went through Ike. Never
18 had a problem at all. The tax flood day, it did come up
19 in the yard. And that was probably -- you know. To the
20 extent -- you know, that I had seen water, you know, it
21 was enough where we couldn't pull our cars in.

22 So -- but then it went right back out. So
23 that was the first time I thought maybe this would be a
24 good idea. But we do live in Houston, so. . .

25 Q. How much do you pay for flood insurance?

1 A. Yes, it is.

2 Q. And Paragraph 5 -- now, when did you do this?

3 A. March --

4 Q. March 28th?

5 A. -- 28th.

6 Q. 2018?

7 A. Yeah.

8 Q. Paragraph 5, that's your view of what happened
9 to your house?

10 A. Yes.

11 Q. Now, with respect to the market values on
12 these appraisals or the appraised values, do you agree
13 with -- do you agree with the market value on this -- on
14 this -- on these sheets?

15 A. Between these two? Or --

16 Q. For any of them.

17 A. (Reading.) I don't know the answer to that.

18 Q. I notice that between 2016 and 2017, the land
19 value doesn't change at all?

20 A. Correct.

21 Q. Do you agree with that?

22 A. Not necessarily, but I don't know.

23 Q. Well, the property was flooded.

24 Was never flooded before 2017, was it?

25 A. No.

1 Q. But it was flooded during 2017?

2 A. Yes.

3 Q. There's nothing in here reflecting that
4 anything like that ever happened?

5 A. Right.

6 Q. I got one last question now, ma'am.

7 A. Okay.

8 Q. If your -- let's say the dams would not have
9 been there. Let's just assume the dams were never
10 there. Would your purchase decision for the home have
11 been the same?

12 MR. DOOHER: Objection; calls for
13 speculation.

14 BY MR. BANES:

15 Q. You can answer if you know.

16 A. If -- would I have bought the property right
17 here?

18 Q. Yeah. Exhibit 1, where it's located.

19 A. If the dams were not --

20 Q. Right.

21 A. I would say I would not have bought the
22 property.

23 Q. Okay.

24 MR. BANES: Nothing further.

25 EXAMINATION

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF
9 PETER SILVERMAN
10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF PETER SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 9:06 a.m. to
16 3:52 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.
23
24
25

1 Q. Okay. Did you ask the previous owners about
2 flooding in your home? Did you ask them about flooding
3 at all? Any previous instances of flooding?

4 MR. HODGE: Objection; form. I think there
5 were two questions there, so -- before he was able to
6 answer.

7 MS. IZFAR: I'll break it apart.

8 Q. (BY MS. IZFAR) Did you ask the previous -- did
9 you discuss with the previous owners any preexisting
10 instances of flooding?

11 A. No.

12 Q. Did you ask them about flooding generally?

13 A. No.

14 Q. Were you concerned at all about flooding?

15 A. No.

16 Q. Was there a reason you weren't concerned about
17 flooding?

18 A. It wasn't -- I had never owned a home, I
19 hadn't -- in Houston. I had never heard about or lived
20 through flooding. This wasn't part of my knowledge set
21 at the time.

22 Q. Would you characterize your home as an
23 arms-length transaction? The purchase of your home as
24 an arms-length transaction between you and the sellers?

25 MR. HODGE: Objection; form. Calls for a

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM)
ADDICKS AND BARKER) Sub-Master Docket
(TEXAS) FLOOD-CONTROL) No. 17-cv-9002L
RESERVOIRS)

ORAL DEPOSITION OF
TIMOTHY STAHL
SEPTEMBER 5, 2018

ORAL DEPOSITION of TIMOTHY STAHL, produced as a witness at the instance of the Defendant, and duly sworn, was taken in the above-styled and numbered cause on September 5, 2018, from 10:10 a.m. to 2:52 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of NEEL, HOOPER & BANES, P.C., 1800 West Loop South, Suite 1750, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

1 Q. Okay.

2 A. And he said that his structure had never
3 gotten wet. His structure is the same elevation as
4 mine.

5 Q. And was this one of the neighbors in --

6 A. It's 267, yes, ma'am.

7 Q. 267. Okay. Is that the same neighbor who
8 lives there today?

9 A. No, ma'am. Phillip passed away, and his wife
10 moved.

11 Q. Okay. And when did that happen? When did
12 they move -- or his wife move?

13 A. I think they sold it in 2016. We'd have to
14 look at the records to be sure.

15 Q. All right. So did Phil describe to you any
16 flooding or describe for you how -- how the creek
17 responds when there's a rain event?

18 A. Well, he said the worst it ever got was high,
19 but not to the point where it got his house wet.

20 Q. Did he point out to you on the ground how
21 high the water had gotten?

22 A. No, ma'am. He was more interested in telling
23 me about his wine collection that was underneath the
24 stairs that he was hiding from his wife.

25 Q. And the wine collection had never gotten wet?

1 A. No, ma'am, it had not.

2 Q. Did the possibility of flooding present any
3 concerns to you at the time you decided to purchase?

4 A. Because --

5 MR. BANES: Objection to form.

6 You can go ahead.

7 A. Because it was not in the hundred-year
8 floodplain and I had firsthand primary source
9 experience with living right next door for the last 30
10 something years, I felt safe. There was no concern
11 about flooding.

12 Q. (BY MS. TARDIFF) At the time of your closing
13 on the property, were there any disclosures -- well,
14 let me step back.

15 Did you talk to the seller of the property at
16 all about flooding before you purchased?

17 A. No, ma'am. The seller was less than inclined
18 to talk to anybody.

19 Q. Okay. So no opportunity to talk to the
20 seller?

21 A. Not until closing where she slid a key across
22 the table.

23 Q. Okay. And at your closing, was there any
24 disclosure from the seller about any flooding of
25 either the home itself or the -- the land between the

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE: DOWNSTREAM §

ADDICKS AND BARKER (TEXAS) §

FLOOD-CONTROL RESERVOIRS §

vs. § SUB-MASTER DOCKET NO.

§ 17-cv-9002L

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

§

ORAL DEPOSITION

MR. SHAWN S. WELLING

August 14, 2018

ORAL DEPOSITION OF MR. SHAWN S. WELLING,
produced as a witness at the instance of the United
States and duly sworn, was taken in the above-styled
and numbered cause on the 14th day of August, 2018,
from 9:22 a.m. to 3:52 p.m., before Michelle Hartman,
Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Potts Law Firm, 3737 Buffalo Speedway, Suite 1900,
Houston, Texas 77098, pursuant to the Federal Rules
of Civil Procedure and the provisions stated on the
record or attached hereto.

<p style="text-align: right;">Page 54</p> <p>1 talked about that.</p> <p>2 Nothing except maintenance.</p> <p>3 Q. Prior to Harvey, had there been any</p> <p>4 occasion where there was ever water in the first</p> <p>5 floor of your property, the test property?</p> <p>6 A. Rising water? No, never.</p> <p>7 Q. Water from any source?</p> <p>8 A. Yes.</p> <p>9 Q. Okay. Tell me about that history. Did</p> <p>10 that occur more than once?</p> <p>11 A. Uh-huh.</p> <p>12 Q. Okay. What is the first one you can</p> <p>13 recall?</p> <p>14 A. Let's see, Ike.</p> <p>15 Q. And prior to Ike, do you ever recall</p> <p>16 any water in the downstairs?</p> <p>17 A. Any time to get only -- only on the</p> <p>18 right side of the building, not the left, not</p> <p>19 anywhere near the AC units or any of the living</p> <p>20 structure. When I say "living structure," I'm</p> <p>21 talking about the original living structure.</p> <p>22 But the new addition on what is now</p> <p>23 considered first floor as well, water will seep</p> <p>24 through and get the floor damp with maybe I would</p> <p>25 say, oh, a quarter of an inch in some areas, some</p>	<p style="text-align: right;">Page 56</p> <p>1 A. That was the first time rising water</p> <p>2 has ever gotten near our building.</p> <p>3 Q. And prior to Harvey?</p> <p>4 A. It -- like I said, I really can't say</p> <p>5 it's been more than a half an inch, a quarter of an</p> <p>6 inch in some areas. There are so many different</p> <p>7 variances, I really don't have a specific time I can</p> <p>8 remember, but it is honest to say it happens</p> <p>9 relatively often --</p> <p>10 Q. Okay.</p> <p>11 A. -- in that one area. Not in any of the</p> <p>12 other first floors, just in that one underneath the</p> <p>13 dance studio area.</p> <p>14 Q. And so then underneath this dance</p> <p>15 studio area, would that have been part of the first</p> <p>16 floor?</p> <p>17 A. No.</p> <p>18 Q. Okay. And --</p> <p>19 (Exhibit 6 marked)</p> <p>20 MR. DAIN: Which number is this?</p> <p>21 THE COURT REPORTER: 6.</p> <p>22 Q. (BY MR. DAIN) Handing you what's been</p> <p>23 marked Welling Exhibit 6.</p> <p>24 I have 1 through 5 here, which are</p> <p>25 some of the discovery responses. I probably should</p>
<p style="text-align: right;">Page 55</p> <p>1 areas.</p> <p>2 Q. And that was true from 2000 forward?</p> <p>3 A. Yeah.</p> <p>4 Q. Like what type of -- I didn't mean to</p> <p>5 interrupt you.</p> <p>6 A. I recall maybe six times it has</p> <p>7 occurred, six, seven times.</p> <p>8 Q. Okay. And what happened in Ike?</p> <p>9 A. Well, not much of anything more than</p> <p>10 any other hard -- really hard rain because it is a</p> <p>11 result of running water coming down and getting</p> <p>12 through the -- the walls. And it's, like I said,</p> <p>13 minimal. So we would just suck it out with -- what</p> <p>14 do you call those things? -- E-vac.</p> <p>15 Q. And that occurred in Ike as a result of</p> <p>16 the Ike rains?</p> <p>17 A. A lot of different times. A lot of</p> <p>18 different times if it's really, really heavy rain.</p> <p>19 But again, not that it is obvious. We can access it</p> <p>20 because we're not excluded to getting to the</p> <p>21 building, and it is minimal to nothing.</p> <p>22 Q. And what is the most accumulation you</p> <p>23 recall down there?</p> <p>24 A. Harvey.</p> <p>25 Q. Prior?</p>	<p style="text-align: right;">Page 57</p> <p>1 have gone ahead and marked (sic) all those, but we're</p> <p>2 going to talk about this one right now.</p> <p>3 These are some floor plans generated</p> <p>4 by an entity that the United States hired to help us</p> <p>5 understand these properties as part of this</p> <p>6 litigation.</p> <p>7 A. So I do have a blueprint of the new</p> <p>8 space. This is great. I like seeing everything all</p> <p>9 official.</p> <p>10 MR. SALISBURY: And to be clear, this</p> <p>11 is something y'all put together, right?</p> <p>12 MR. DAIN: This is something that we,</p> <p>13 that the United States, has created.</p> <p>14 MR. SALISBURY: Right.</p> <p>15 THE WITNESS: Okay. Okay.</p> <p>16 Q. (BY MR. DAIN) So the last page of this</p> <p>17 in the lower left-hand corner states "Welling, lower</p> <p>18 studio."</p> <p>19 A. Uh-huh.</p> <p>20 Q. Can you identify what that is?</p> <p>21 A. It was usually set out to be Studio B.</p> <p>22 It still is being used for that purpose, in two</p> <p>23 different functions for us. One if a private lessons</p> <p>24 need to occur during a time of --</p> <p>25 (Phone vibrates.)</p>

John Britton

July 16, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE: UPSTREAM ADDICKS)
3 AND BARKER (TEXAS))
4 FLOOD-CONTROL RESERVOIRS)
5) CASE NO. 17-cv-9002L
6 THIS DOCUMENT RELATES TO:)
7 ALL DOWNSTREAM CASES)

8 ORAL DEPOSITION

9 JOHN BRITTON

10 30(B)(6) MEMORIAL SMC INVESTMENT 2013, LP

11 JOHN BRITTON

12
13 ORAL 30(b)(6) DEPOSITION OF JOHN BRITTON,
14 Memorial SMC Investment 2013, LP, produced as a
15 witness at the instance of the JOHN BRITTON and duly
16 sworn, was taken in the above-styled and numbered
17 cause on the 16th day of July, 2018, from 9:10 a.m.
18 to 2:19 p.m., before Shauna Foreman, Certified
19 Shorthand Reporter in and for the State of Texas,
20 reported by computerized stenotype machine at the
21 offices of Vinson & Elkins, 1001 Fannin, Suite 2500,
22 Houston, Texas, pursuant to the Federal Rules of
23 Civil Procedure and the provisions stated on the
24 record or attached hereto.
25

John Britton

July 16, 2018

<p style="text-align: right;">Page 34</p> <p>1 drainage on how they would ultimately fix the</p> <p>2 location of the buildings in terms of height and</p> <p>3 drain the buildings. And we looked at the title</p> <p>4 policy to determine if there were any encumbrances on</p> <p>5 the title that would prevent the development.</p> <p>6 Q. All right. And who were your civil</p> <p>7 engineers?</p> <p>8 A. Walter P. Moore.</p> <p>9 Q. What's the last name?</p> <p>10 A. Moore, M-O-O-R-E.</p> <p>11 Q. At the time that you were doing this</p> <p>12 analysis, were you aware of the proximity to the</p> <p>13 Addicks Dam?</p> <p>14 A. I mean, we were aware that the dams were</p> <p>15 there. Growing up in Houston, you know, the dams</p> <p>16 have been there my entire life. So --</p> <p>17 Q. And had there been ever any analysis</p> <p>18 performed that related to the potential for releases</p> <p>19 from the -- from the dam?</p> <p>20 A. No.</p> <p>21 MR. McNEIL: Well, before you go any</p> <p>22 further, analysis by whom?</p> <p>23 MR. DAIN: Anyone that he knew of.</p> <p>24 Q. (BY MR. DAIN) I'm talking about your</p> <p>25 knowledge.</p>	<p style="text-align: right;">Page 36</p> <p>1 Q. Did your civil engineer ever raise any</p> <p>2 concerns about the proximity of the property to the</p> <p>3 Buffalo Bayou?</p> <p>4 A. No.</p> <p>5 Q. Was there any discussions with your civil</p> <p>6 engineers about the proximity of the site to the</p> <p>7 Buffalo Bayou?</p> <p>8 A. Not to my knowledge. Again, we looked at</p> <p>9 where the -- the height -- the elevation of the</p> <p>10 property relative to the flood zone, and that's kind</p> <p>11 of the biggest thing you look at in Houston, Texas.</p> <p>12 Again, we verified that there were no</p> <p>13 encumbrances on the title. And then in formulating a</p> <p>14 final elevation with the civil engineer, we relied on</p> <p>15 their calculations and ended up building this several</p> <p>16 feet above the hundred-year flood plain. We were not</p> <p>17 quite to the 500-year flood plain level, but pretty</p> <p>18 close.</p> <p>19 Q. And had you been aware of any instance in</p> <p>20 which the property had ever been flooded</p> <p>21 historically?</p> <p>22 A. No.</p> <p>23 Q. Were you, at the time you purchased, aware</p> <p>24 of any instance in which South Mayde Creek had ever</p> <p>25 overtopped its banks with water?</p>
<p style="text-align: right;">Page 35</p> <p>1 MR. McNEIL: Objection. Form.</p> <p>2 A. There was no analysis by Grayco of the dam</p> <p>3 release or anything like that.</p> <p>4 Q. (BY MR. DAIN) Did you look at -- were</p> <p>5 you -- did you ever know or have anybody investigate</p> <p>6 the protocols associated with the operations of the</p> <p>7 dams, as to when they would release water, how much</p> <p>8 water they might release, under what conditions there</p> <p>9 would be releases, factors such as that?</p> <p>10 A. No.</p> <p>11 Q. So, now, you make sure I have my</p> <p>12 phraseology right. There was \$77 million in</p> <p>13 development costs at the time of -- through the time</p> <p>14 of completion of the apartment complex, correct?</p> <p>15 A. Approximately.</p> <p>16 Q. Approximately. Fair enough.</p> <p>17 And in addition to those -- to the</p> <p>18 development costs, had Grayco incurred other costs in</p> <p>19 exploring this investment?</p> <p>20 A. Through completion, that was a</p> <p>21 comprehensive view of the costs. Post-completion, we</p> <p>22 spent probably a couple million dollars more in</p> <p>23 operating deficit carry costs to get it to</p> <p>24 stabilized -- a stabilized level of leasing where it</p> <p>25 was self-sustaining.</p>	<p style="text-align: right;">Page 37</p> <p>1 A. I wasn't specifically aware of that, but</p> <p>2 the creek overtopping its banks doesn't necessarily</p> <p>3 imply that the property that we built and the level</p> <p>4 we built would flood.</p> <p>5 Q. I understand the distinction. I'm just --</p> <p>6 A. So, no, we had no specific -- I had no</p> <p>7 knowledge of prior flooding, but bayous and rivers</p> <p>8 flood in Houston all the time.</p> <p>9 Q. What was the last -- I just didn't hear the</p> <p>10 last part of your phrase.</p> <p>11 A. Bayous and rivers come out of their banks,</p> <p>12 flood in Houston.</p> <p>13 Q. I'm going to just jump -- I'm going to ask</p> <p>14 about some of the types of documents I've seen in the</p> <p>15 production today and just ask some questions</p> <p>16 generically about them so I understand who generates</p> <p>17 them and what they are used for, all right?</p> <p>18 A. Yes.</p> <p>19 Q. I see a document called Box Score. Have</p> <p>20 you seen those?</p> <p>21 A. Yes.</p> <p>22 Q. Okay. What is -- what's the purpose of</p> <p>23 that document?</p> <p>24 A. Box Score is created by our management</p> <p>25 company, generated from the property management</p>

10 (Pages 34 - 37)

ORAL DEPOSITION OF VAL ALDRED, produced as a witness at the instance of the Defendant and duly sworn, was taken in the above styled and numbered cause on Wednesday, August 1, 2018, from 8:58 a.m. to 3:31 p.m., before Rene White Moarefi, CSR, CRR, RPR in and for the State of Texas, reported by computerized stenotype machine, at the offices of Potts Law Firm, 3737 Buffalo Speedway, Suite 1900, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and any provisions stated on the record herein.

Val Aldred

August 1, 2018

Page 218

1 Q. Have you heard of --
 2 A. -- experience.
 3 Q. Sorry to cut you off.
 4 A. That's okay.
 5 Q. Have you heard of the term "hurricane
 6 season"?
 7 A. Yes.
 8 Q. What does that mean to you?
 9 A. It means the period of time starting -- I
 10 think it's after Memorial Day end of May up and
 11 through and including October the 31st with the
 12 heaviest part of it being August and September.
 13 Q. Why do you think there's a hurricane
 14 season in Houston?
 15 A. I think there's a hurricane season just
 16 because the meteorologists claim it to be so. I
 17 don't know that it's necessarily confined to Houston
 18 alone. It could hit anywhere in the United States.
 19 They come from Africa and move their way across the
 20 Atlantic and then find their way into Mexico or
 21 Central America, wherever they land.
 22 Q. Do you think that a hurricane can hit
 23 anywhere regardless of what city you're located in?
 24 A. Sure. I mean, yeah. They have to end up
 25 somewhere.

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1 Q. Have you ever heard of Addicks and Barker
 2 Reservoir prior to Harvey?
 3 A. Sure.
 4 Q. When was the first time you heard about
 5 Addicks Reservoir?
 6 A. Probably when I was a kid growing up in
 7 Houston.
 8 Q. Did you used to visit Addicks Reservoir?
 9 A. Yeah, I used to go across the one that's
 10 south side of I-10, whichever one that one is. I
 11 never can keep them straight.
 12 Q. I believe that's Barker Reservoir.
 13 A. Okay.
 14 Q. What would you do on Barker Reservoir?
 15 A. We were just kids driving around, you
 16 know, before it was developed.
 17 Q. When was that?
 18 A. 1969.
 19 Q. Can you describe what Barker Reservoir
 20 looked like around that time?
 21 A. Just a big old field of nothing.
 22 Q. And what does it look like now?
 23 A. Last time I went, I saw a shooting range,
 24 dog run, still pretty much nothing.
 25 Q. What about the area around Barker? What

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1 does it look like?
 2 A. Well, the area around Barker is the dam
 3 itself. I'm talking about anything that's inside
 4 the walls. Which area are you referring to?
 5 Q. Well, I'm referring to actually outside
 6 of the walls.
 7 A. Oh, I don't know.
 8 Q. In 1969 when you used to drive there, was
 9 there anything outside of the walls?
 10 A. I-- could be. I mean, it's a long time
 11 ago. We drove up to the -- and over the -- the dam
 12 itself. I didn't pay much attention. By that
 13 time -- I mean, I just don't know. It's too long
 14 ago to remember.
 15 Q. Did you ever go to Bear Creek Park?
 16 A. Sure.
 17 Q. Okay. Did you ever go to any other parks
 18 within Addicks and Barker?
 19 A. Which other ones are there?
 20 Q. I guess now there's George Bush Park.
 21 A. Okay. That would be the one that's
 22 inside the one where all these dog runs -- the
 23 Millie Bush Park, is that the one you're talking
 24 about? That's the dog run that's on the south side
 25 of I-10. See, I still can't remember.

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1 Q. That one's Barker.
 2 A. Okay.
 3 Q. Did you consider proximity to these parks
 4 at all when you purchased your home?
 5 A. No.
 6 Q. Did you consider -- what's Hershey Park?
 7 A. I'm sorry?
 8 Q. What's Hershey Park?
 9 A. That is a bike trail that was developed
 10 by a lady who was an environmentalist back in --
 11 whenever it came about that she did it. And it
 12 started out in West Houston just about where
 13 Memorial and Eldridge intersect, or at least that's
 14 where part of it is, and -- and was further
 15 developed west or eastward toward downtown. I don't
 16 know where it actually ends up, but it's bike and
 17 jogging trails and things like that.
 18 Q. Do you have a portion of Hershey Park
 19 that is near you?
 20 A. Well, I go to a part of it that's along
 21 Buffalo Bayou that I usually take walks through.
 22 Q. Do you walk your dogs there?
 23 A. No, it's too far away from my house. I
 24 walk over there myself and then walk down the -- the
 25 length of the bayou from about Dairy Ashford up

56 (Pages 218 - 221)

Val Aldred

August 1, 2018

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1 through -- up to Eldridge and then come back up
 2 Eldridge to my house.
 3 Q. Do you consider living near Hershey Park
 4 to be an amenity?
 5 A. I do.
 6 Q. What is your understanding of how Addicks
 7 and Barker work? And I'm -- and to clarify, I'm
 8 asking for your pre-Harvey understanding of how they
 9 work.
 10 A. They're there to basically retain water
 11 that would have -- would have overflowed Buffalo
 12 Bayou to the point it would have washed out downtown
 13 Houston.
 14 Q. When you say "they're there to retain
 15 water," are they normally wet reservoirs?
 16 A. When it rains, it definitely is. When
 17 you have dry spells like what we're going through
 18 right now, probably don't have as much.
 19 Q. So when you would go driving in Barker
 20 Reservoir, was it dry?
 21 A. The time we did it was. This is back in
 22 '69.
 23 Q. Right.
 24 A. It just happened, you know, whatever day
 25 that was. We didn't go in if it was wet, that's for

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1 sure.
 2 Q. When you went through -- when you went to
 3 Bear Creek Park, was it wet or was it dry?
 4 A. Well, it had a golf course there, and so
 5 any time we played golf, it was -- it was dry.
 6 Q. Okay. Is your understanding that
 7 during -- during rainfalls, the area would hold
 8 water?
 9 A. Yes.
 10 Q. And when did you learn that that area
 11 holds water?
 12 A. As soon as I got back -- I guess sometime
 13 after I moved back into Houston. I mean, I kind of
 14 knew they did, but it's kind of like Cuba. You know
 15 it's out there, but you really don't pay that much
 16 attention until somebody draws your attention to it.
 17 You know it's there, but you don't pay any attention
 18 to it. I knew the dams were there, but . . .
 19 Q. Right. So --
 20 A. And I knew what they were for, yeah.
 21 Q. So in 1997 when you purchased your home,
 22 did you know that the dams existed to hold water?
 23 A. Sure.
 24 Q. Do you know how the dams operate during a
 25 rain event?

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1 A. They collect water that comes in and
 2 dispense it as -- so as to not make it, you know,
 3 flood the bayou, and they drain out slowly but
 4 surely to where the bayou can handle the flow of
 5 water.
 6 Q. Do you know how they hold the water back?
 7 A. It's -- it's a dam. They have gates that
 8 open up when they want to release it.
 9 Q. So during Harvey, do you have an
 10 understanding of whether the gates were opened or
 11 closed at the beginning of the storm, say, around
 12 August 26th?
 13 A. I have no idea how those guys operated
 14 that.
 15 Q. Do you believe the gates were closed on
 16 August 27th?
 17 A. I just don't know.
 18 Q. You allege that the United States Army
 19 Corps of Engineers released water onto your home
 20 which flooded your home, correct?
 21 A. Correct.
 22 Q. What water did they release?
 23 A. The water that was inside the reservoirs.
 24 Q. So is it your understanding, then, that
 25 the gates were closed before the US Army Corps of

Page 225

1 Engineers opened the gates and made the releases?
 2 A. I don't know -- I don't know about that.
 3 I know that whatever they released was too much
 4 water at one time to where the bayou couldn't handle
 5 it and water backed up into neighborhoods.
 6 Q. What do you think the Corps should have
 7 done to prevent flooding on your home?
 8 A. I'm not an expert on that. I wish
 9 somebody could have at least warned me to tell me to
 10 get out of the house before the water came.
 11 Q. Do you think the Corps could have
 12 prevented flooding on your home?
 13 A. You mean beforehand?
 14 Q. Do you think that the Corps could have
 15 prevented the flooding that took place on your home?
 16 A. I don't know.
 17 Q. What do you think would have happened if
 18 the Corps had not closed the gates during Harvey, if
 19 the Corps had left the gates open?
 20 A. You mean from the time the first raindrop
 21 fell?
 22 Q. Right.
 23 A. We'd have had a whole lot of water come
 24 out sooner than later and who knows.
 25 Q. Do you think that that would have flooded

Phillip Azar

July 9, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
 2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
 3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
 4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO
 5 ALL DOWNSTREAM CASES)

6
 7 -----
 ORAL DEPOSITION OF

8
 PHILLIP AZAR

9
 JULY 9, 2018
 10 -----

11
 12 ORAL DEPOSITION OF PHILLIP AZAR, produced as a
 13 witness at the instance of the United States, and duly
 14 sworn, was taken in the above-styled and numbered cause
 15 on the 9th day of July, 2018, from 9:02 a.m. to
 16 5:03 p.m., before Morgan Veletzuy, CSR in and for the
 17 State of Texas, recorded by machine shorthand, at Kirby
 18 Mansion, 2000 Smith Street, Suite 550, Houston, Texas
 19 77002, pursuant to the Federal Rules of Civil Procedure
 20 and the provisions stated on the record or attached
 21 hereto; that the deposition shall be read and signed
 22 before any notary public.

1 but that -- in front of the dams and reservoirs, but the
2 houses behind the reservoirs, behind the dams. I'm sure
3 they were starting to get flooded too. They had to
4 release it. It had to go somewhere, and I guess it
5 ended up in my living room. I don't know what to tell
6 you.

7 Q. Are there specific government actions, though,
8 that you're alleging took your real property?

9 MR. ROBERTS: Objection; calls for
10 speculation.

11 A. Well, you certainly can --

12 MR. ROBERTS: Vague.

13 A. -- talk to my attorney about that because I
14 really don't know. I know that -- I know what a taking
15 is because that happened off of I-10 to St. James Place.
16 That was my client. And they took the property for the
17 benefit of other people, other people driving down I-10
18 every day. And they didn't want to pay and it ended up
19 in litigation. Finally, they settled. But this was a
20 taking also. The same way I think.

21 Q. (BY MR. LEVINE) What are you alleging the
22 government did to take your personal property?

23 MR. ROBERTS: Objection; asked and
24 answered.

25 A. They -- they damaged the property by the

1 release that they did. And I'm not sure when they
2 released it, but whenever they released it, they damaged
3 the property. And inside the property was the personal
4 property.

5 Q. (BY MR. LEVINE) Okay. When you say released
6 it, what is it?

7 A. I guess the reservoirs and the dams that are
8 upstream. I didn't know of any dams prior to moving in
9 there. I didn't know of any dams prior to any of these
10 floods, including this last one. But I guess there's
11 dams and reservoirs and everything that I've read about.

12 Q. Prior to Hurricane Harvey, were you aware of
13 the Addicks and Barker dams?

14 A. I've heard of them. I've heard of something on
15 Highway 6. I didn't know it even governed the Buffalo
16 Bayou.

17 Q. Did you have any idea how they worked?

18 A. No, sir. I knew that they came down there and
19 it was either the flood on 2015 or 2016. That's when
20 all of the Corps people were out in my yard, and I
21 chased them off and one guy came back.

22 And I said, "Look, why don't you just throw
23 your slide rules down and your calculators down and put
24 a camera up. And that way" -- because they liked that
25 area because my backyard had a good clearing of seeing

1 the whole bayou, a good part of it right there. And a
2 wide part, a skinny part or something, whatever they
3 wanted to see, they liked it there.

4 So I said, "Just put a camera there. That
5 way you guys can observe that where you're at. You'll
6 know when it's up or down." And I don't know whether
7 that camera was there during Harvey or not.

8 Q. Knowing what you know now about how those dams
9 and reservoirs work, do you think that they have
10 protected your home during storm events in the past?

11 MR. ROBERTS: Objection; calls for
12 speculation.

13 A. Well, this will probably go both ways, but my
14 real answer would be I would never move in there if I
15 thought this would have happened, number one. Number
16 two, I remember talking to Bobby Deden, the hydrologist
17 that we mentioned, Bobby, D-E-D-E-N.

18 And I said, "Bobby, I thought you said this
19 would probably never flood." And this was back in, I
20 want to say, '92, a couple years, maybe '94, whatever
21 that flood was after. And they had 18-wheelers floating
22 down I-10. And I found out later from talking to Bobby
23 the reason that that flood happened is because -- that's
24 the first time I ever heard about it -- was because the
25 people that were supposed to be going down to the dam,

1 the reservoir or something to control it, got stuck in
2 the -- in the high water on I-10 or something like that.

3 But now they have access to a helicopter.
4 Now, that's just what I heard. I don't know anything,
5 but that's what Bobby told me. But that won't happen
6 again because they have access to a helicopter.

7 Q. (BY MR. LEVINE) Would you describe Houston as
8 flood prone?

9 A. Well, sure.

10 Q. Do you think that the Addicks and Barker dams
11 and reservoirs protect downstream residents from -- from
12 flooding?

13 MR. ROBERTS: Objection; calls for
14 speculation.

15 A. I have no knowledge. I really don't. What I
16 do depend on, and I think everybody depends on,
17 including you when you buy a house, is restrictions and
18 city municipalities. I looked through everything. I
19 didn't see any problem with that house, or I wouldn't
20 have bought it.

21 Q. (BY MR. LEVINE) When you say "restrictions,"
22 can you describe a little bit for me what you mean?

23 A. You can't build a house in Hunter's Creek
24 unless you have at least a half acre. If you have less
25 than a half acre, you can't build a house. Restriction

DEPOSITION OF JANA CANAN BEYOGLU

DEPOSITION AND ANSWERS of JANA CANAN BEYOGLU, taken before Edith A. Boggs, a certified shorthand reporter in Harris County for the State of Texas, taken at the law offices of Neel, Hooper & Banes, PC, 1800 West Loop South, Suite 1750, Houston, Texas, on the 18th day of September, 2018, between the hours of 1:49 p.m. and 5:06 p.m.

1 apartment that long. I couldn't. It's just too small
2 and I couldn't stay. I had a problem with -- after all
3 these Harvey, I couldn't -- I cannot stay in small
4 areas.

5 Q. Okay. So, after that, you went back home,
6 lived there for about another --

7 A. I thought I would be able to do it for about a
8 month or so, start fixing the house, but we couldn't
9 find any contractors. So -- and I couldn't stay either.
10 So, we purchased. We got into a new house.

11 Q. When did you start looking for the new house?

12 A. After we moved into the house, immediately I
13 started looking at new house.

14 Q. And you said that you bought that one in
15 February of 2018, this year?

16 A. Yeah, end of February.

17 Q. How long did it take you to find that one?

18 A. Well, we didn't have too much choices, I guess.
19 We just had to get out. So, we didn't look at
20 particularly everything. So, this is the one we said,
21 "Okay. We can live in it," and we bought it. So, we
22 didn't look for too long.

23 Q. And what community or development are you
24 currently living in?

25 A. North Eldridge. It's a closed community, gated

JANA CANAN BEYOGLU
IN RE DOWNSTREAM ADDICKS

September 18, 2018
98

1 community.

2 Q. A gated community?

3 A. A gated community.

4 Q. Do you know if that property is located near
5 the Addicks reservoir?

6 A. Yes, we do.

7 Q. What did you know about the Addicks and Barker
8 reservoirs prior to Harvey?

9 A. Nothing. I didn't hear anything.

10 Q. You didn't know of their existence prior to
11 Harvey?

12 A. I mean, we knew it was there.

13 Q. So, you knew the reservoirs were there?

14 A. Yes.

15 Q. Okay. What did you know about other than it
16 was there?

17 A. Nothing else. It was there.

18 Q. What did you know about the purpose of the
19 reservoirs?

20 A. To provide us clean water.

21 Q. Provide clean water?

22 A. Provide us the water, yeah, clean water,
23 drinking water, nice water. I don't know.

24 Q. Okay. For the Addicks and Barker reservoirs?

25 A. Yeah.



800.211.DEPO (3376)
EsquireSolutions.com

1 Q. Okay. How much did you spend, if you can
2 estimate -- well, what was your monthly rent where you
3 were staying temporarily at the apartments?

4 A. The apartments? 1,800 maybe. One bedroom.

5 Q. About 1,800? The documents that you provide
6 will have that information?

7 A. Yes, it will.

8 Q. Okay.

9 A. No. 1,400 or something. I'm sorry. 1,400 or
10 something, and then other expenses and stuff. We paid
11 for electricity and stuff. I think it was coming up
12 1,800 or something like that.

13 Q. And you mentioned that it took a very long time
14 to even get an estimate from a contractor?

15 A. We couldn't even reach anybody. They were not
16 even returning our -- they were saying they were going
17 to come and they never did. I mean, I remember my
18 husband were on the phone with a lot of them, trying to
19 get estimates and stuff.

20 And like I said, I didn't get involved too
21 much on this part. I didn't want to either. I
22 didn't -- I didn't want to. So, he was more involved
23 with all those stuff, all the contracting stuff, all the
24 insurance stuff, all those stuff.

25 Q. So, you were the one that made the initial

Dana Cutts

June 27, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
 2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
 3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
 4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO)
 5 ALL DOWNSTREAM CASES)

6
 7 -----
 ORAL DEPOSITION OF

8
 DANA CUTTS

9
 JUNE 27, 2018
 10 -----

11
 12 ORAL DEPOSITION OF DANA CUTTS, produced as a
 13 witness at the instance of the United States, and duly
 14 sworn, was taken in the above-styled and numbered cause
 15 on the 27th day of June, 2018, from 9:07 a.m. to
 16 2:55 p.m., before Morgan Veletzuy, CSR in and for the
 17 State of Texas, recorded by machine shorthand, at the
 18 offices of McGehee, Chang, Landgraf, 10370 Richmond
 19 Avenue, Suite 1300, Houston, Texas 77042, pursuant to
 20 the Federal Rules of Civil Procedure and the provisions
 21 stated on the record or attached hereto; that the
 22 deposition shall be read and signed before any notary
 23 public.

1 accurate description of our neighborhood.

2 Q. Okay. And so just for the record, I will note
3 that the range -- and the range goes backwards -- is
4 LUCO 0000249 to LUCO 0000242.

5 A. I guess, yeah.

6 MR. CHANG: I don't think there's an "O" in
7 there.

8 THE WITNESS: There's no "O" in there.
9 That's what you're saying wrong.

10 MS. DUNCAN: Oh, that's the problem. Thank
11 you for pointing that out.

12 Q. (BY MS. DUNCAN) Excuse me. Let's do this
13 range again. LUC 0000249 to LUC 0000242.

14 Mrs. Cutts, these pictures were taken in
15 the last few months. Do you have any -- does this -- do
16 these pictures fairly and accurately represent your --
17 your neighborhood as it appeared in the past few months?

18 A. As far as I know, yes.

19 Q. Okay.

20 MR. McGEHEE: We have a request. It's not
21 me. But we have a request to take a break.

22 MS. DUNCAN: Let's take a short break.
23 Let's do ten minutes. And I show as the time -- let's
24 see. I show 11:02. Great.

25 (Break taken from 11:02 a.m. to 11:10 a.m.)

1 MS. DUNCAN: Okay. Great. Go back on the
2 record. I show a time of 11:10.

3 Q. (BY MS. DUNCAN) Mrs. Cutts, feel free to
4 stretch or stand up.

5 A. Thank you.

6 Q. Or move around as makes you comfortable.

7 A. Thank you.

8 Q. When you purchased the property, what did you
9 know about Addicks and Barker Reservoirs?

10 A. Nothing.

11 Q. Okay. When did you first learn about the
12 existence of Addicks and Barker Reservoirs?

13 A. I do not remember.

14 Q. Okay. Can you give me an approximation of
15 about how long you've known about the reservoirs?

16 A. No, I cannot because I have no recollection of
17 any date that I might have learned about it.

18 Q. Okay. I'm going to ask you a few more
19 questions about that but in the context of some other
20 things.

21 A. Sure.

22 Q. So we'll come back to that.

23 Have you ever seen the Army Corps of
24 Engineers host any public meetings?

25 A. No.

1 Q. Okay. Have you ever seen the Army Corps of
2 Engineers ever send any e-mails?

3 A. No.

4 Q. Have you ever been to the Army Corps of
5 Engineers' website?

6 A. No, I don't believe so.

7 Q. Okay. Okay. Have you ever received any
8 materials describing the reservoirs from other local
9 governments such as the County or the City, things like
10 that?

11 A. Before the flood? During the flood? After the
12 flood? Do you have any timeline you want me to respond
13 to?

14 Q. Let's -- let's talk about each of those. Let's
15 start with before the flood.

16 A. So could you rephrase that question, please?

17 Q. Yes. Yes. Did you receive any information
18 about the reservoirs from local governments before
19 Hurricane Harvey?

20 A. All I remember receiving were news reports
21 about the reservoirs filling up, the gates being opened.
22 That's all I remember.

23 Q. Okay. And so the news reports about the
24 reservoirs filling up, that's in reference to Hurricane
25 Harvey?

Paul Cutts

June 27, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
 2 IN RE UPSTREAM ADDICKS)
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 3 FLOOD-CONTROL RESERVOIRS)
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6
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8
 PAUL CUTTS

9
 JUNE 27, 2018
 10 -----

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 12 ORAL DEPOSITION OF PAUL CUTTS, produced as a
 13 witness at the instance of the United States, and duly
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 15 on the 27th day of June, 2018, from 3:01 a.m. to
 16 4:06 p.m., before Morgan Veletzuy, CSR in and for the
 17 State of Texas, recorded by machine shorthand, at the
 18 offices of McGehee, Chang, Landgraf, 10370 Richmond
 19 Avenue, Suite 1300, Houston, Texas 77042, pursuant to
 20 the Federal Rules of Civil Procedure and the provisions
 21 stated on the record or attached hereto; that the
 22 deposition shall be read and signed before any notary
 23 public.
 24
 25

1 home?

2 A. 311 Blue Willow, Houston, 77042.

3 Q. Okay. And from your perspective, why -- why
4 did you purchase the house?

5 A. Well, we were looking for a long time. At that
6 time there were a lot of families coming down to
7 Houston. Shell Oil transferred all their corporate
8 offices down here, and I was part of coordinating that
9 transfer. Real fun. But...

10 Q. What would you say the -- the primary reasons
11 were that you purchased the home you purchased?

12 A. Well, we were tired of looking. But frankly,
13 we loved it, and we just sort of fell onto it. It was
14 so well maintained. And we did meet the buyers. We
15 didn't get to know them well. But we felt that they
16 were the kind of owners that we'd like to follow. And
17 we've always enjoyed the house. The school was -- a
18 very good reputation for a grade school. And it was a
19 walk to the school, not a drive or a bus.

20 So we felt there were so many advantages to
21 just the location. So you know, we felt it was the
22 perfect house at that time.

23 Q. Okay. Was risk of flooding a consideration in
24 your purchase?

25 A. Pardon?

1 Q. Was risk of flooding a consideration when you
2 made the purchase?

3 A. No. We didn't really give that much thought.

4 Q. Okay. At the time you made the purchase, were
5 you aware of Addicks and Barker Reservoirs?

6 A. No.

7 Q. Do you recall when you became aware of Addicks
8 and Barker Reservoirs?

9 A. Probably somewhere along the first few years
10 when we were living there. And, you know, you get to
11 talk about your backgrounds and all that kind of stuff
12 and where you are and what's around you, that sort of
13 thing. You begin to get familiar with where you're
14 living. At some point, we probably stumbled on that. I
15 don't recall any gee whiz. I mean, it just -- yeah.

16 Q. And what do you understand the purpose of the
17 reservoirs to be?

18 A. Well, I thought it was to keep flood waters
19 from overtaking the land and so you had a place to
20 contain it until it could evaporate or flow out. In
21 other words, it was a way to manage the flood-related
22 problems in the area.

23 Q. Do you think that the Addicks and Barker
24 Reservoirs have done that job?

25 A. That's hard to say. We haven't had any

1 flooding in our neighborhood. But, I mean, you see the
2 neighborhoods in the news when we have flooding and
3 you -- you know, is it working? I don't know. I really
4 don't know.

5 Q. Okay. There is a ditch that is managed by
6 Harris County Flood Control District behind your home.

7 Are you familiar with what I'm referencing?

8 A. Yes. Yeah, I was listening.

9 Q. Great. Great. Do you understand whether --
10 well, what do you understand the purpose of that ditch
11 to be?

12 A. Well, I always thought it was a runoff for
13 Buffalo Bayou. It was to get the water there.

14 Q. Okay. So what is your understanding of where
15 the water flows to from that ditch?

16 A. I think it flows north, but I don't know much
17 more about it than that. It probably travels somewhere
18 down to the Gulf eventually.

19 Q. Does the water in the ditch behind your home
20 flow into Buffalo Bayou?

21 A. I think it does. But again, I'm not that
22 familiar with that element here.

23 Q. Do you know how far your home is from Buffalo
24 Bayou?

25 A. About a mile. I don't know. Less than a mile

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE DOWNSTREAM : Sub-Master Docket

3 ADDICKS AND BARKER : No. 17-cv-9002L

(TEXAS) FLOOD-CONTROL :

4 RESERVOIRS :

: Judge Susan G.

5 : Braden

THIS DOCUMENT RELATES :

6 TO: :

:

7 ALL TEST PROPERTIES :

8 * * *

9 MONDAY, SEPTEMBER 17, 2018

10 * * *

11
12 Oral deposition of ARNSTEIN GODEJORD
13 taken at the law offices of Neel, Hooper &
14 Banes, P.C. 1800 West Loop South, Suite 1750,
15 Houston, Texas, commencing at 9:07 a.m.
16 before Debbie Leonard, Registered Diplomate
17 Reporter, Certified Realtime Reporter.

18
19
20
21
22
23 * * *

1 A. It varies a bit, but sometimes
2 several times a week. Not all the way down
3 to the bayou but to the park.

4 Q. What type of activities do you
5 do in the park?

6 A. I like to run.

7 Q. And prior to the purchase of
8 your home, had you gone down -- did you go
9 down to Buffalo Bayou from the house before
10 you bought it?

11 A. Not from the house.

12 Q. Were you aware of the presence
13 of Buffalo Bayou --

14 A. Yes.

15 Q. -- prior -- prior to your
16 purchase of the house?

17 A. Yeah.

18 Q. And was there a park there at
19 that time?

20 A. Yes.

21 Q. And did you have any plans to
22 use the park when you purchased the house?

23 A. Oh, I would say yes.

24 Q. So back a little bit earlier in
25 the deposition, we talked about changes that

1 you've made to the house since you purchased
2 it, and you had mentioned you had made some
3 changes to the master bedroom.

4 A. Uh-huh.

5 Q. Could you please tell me what
6 those changes were?

7 A. Oh, that was actually related
8 to the water damage. Water came in.

9 Q. After Ike?

10 A. Yeah.

11 Q. So would you --

12 A. It -- it was just repair, I
13 would say. Like, we had to change the tiles
14 in the -- we had to tear down some of the
15 walls and change some tiles in the shower,
16 things like that.

17 Q. So who else has lived at the
18 house besides you after you purchased it?

19 A. My wife and son.

20 Q. And has this been your family's
21 primary residence?

22 A. Yes.

23 Q. So before you purchased your
24 home, did you have any knowledge of the
25 existence of the Addicks -- the Addicks

1 Reservoir and the Barker Reservoir?

2 A. No.

3 Q. Do you recall when you learned
4 of their existence?

5 A. It's hard to say an exact point
6 in time.

7 Q. Just, like, a general -- was it
8 mid-2000s, like, right before Harvey?

9 A. I think -- I would almost say
10 it was, like, at the event of Harvey I
11 learned what that park is for. To me, it was
12 a park, big park.

13 Q. So would it be fair to say,
14 then, you weren't aware of the purpose of the
15 Addicks Reservoir and the Barker Reservoir
16 prior to Hurricane Harvey?

17 A. Yes. I would say yes to that.

18 Q. So I guess -- had you ever gone
19 into any meetings with the Corps of Engineers
20 about the Addicks and Barker Reservoirs prior
21 to Hurricane Harvey?

22 A. No.

23 Q. And so -- now, going to
24 Hurricane Harvey, when did you first learn
25 that your home may be at risk for flooding

1 during Hurricane Harvey?

2 A. At the risk of flooding, I
3 think I learned when my son called us and say
4 that they are releasing the water. He had
5 heard that on the news, and he said that he
6 might have to evacuate the house.

7 Q. And where were you and your
8 wife at this time?

9 A. In Canada.

10 Q. So was there anyone at your
11 house other than your son?

12 A. Yes, there was one -- one
13 person visiting us at that point. So there
14 were two.

15 Q. And how old was your son?

16 A. Well, he's 26 now, so he was 25
17 at that time.

18 Q. So what did you do when you
19 learned that your house may need to be
20 evacuated, since you were in Canada?

21 A. Preparing to -- to go back to
22 Houston.

23 Q. Did you ask your son to do any
24 preparations at the house to prepare for a
25 potential evacuation?

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE DOWNSTREAM : Sub-Master Docket

3 ADDICKS AND BARKER : No. 17-cv-9002L

(TEXAS) FLOOD-CONTROL :

4 RESERVOIRS : Judge Susan G.

: Braden

5 :

THIS DOCUMENT RELATES :

6 TO: :

ALL TEST PROPERTIES :

7
8 * * *

9 MONDAY, SEPTEMBER 17, 2018

10 * * *

11
12 Oral deposition of INGA GODEJORD taken
13 at the law offices of Neel, Hooper & Banes,
14 P.C. 1800 West Loop South, Suite 1750,
15 Houston, Texas, commencing at 1:01 p.m.
16 before Debbie Leonard, Registered Diplomate
17 Reporter, Certified Realtime Reporter.

18
19
20
21
22
23 * * *

1 reporter get that?

2 THE REPORTER: I was going to
3 ask how to spell it later, but I did
4 get it.

5 MS. HELD: Oh, okay.

6 MR. BANES: N-E-S-M-I-T-H,
7 Laura, L-A-U-R-A.

8 THE WITNESS: Actually,
9 L-A-R-A, Lara.

10 MR. BANES: Lara. L-A-R-A?

11 THE WITNESS: Yeah.

12 MR. BANES: Yeah, that's right.

13 That's right.

14 BY MS. HELD:

15 Q. And how did you choose Lara to
16 be your real estate agent for this
17 transaction?

18 A. I think my husband worked with
19 some Norwegians. His colleagues, it was,
20 like, they referred, so she helped many
21 Norwegians here in Houston, so --

22 Q. So when you were looking at
23 homes, did you talk to anyone else for advice
24 besides Lara, your real estate agent?

25 A. Not me.

1 Q. And when you were looking at
2 homes in the Houston area, did you have any
3 understanding of potential flood risks in
4 different areas of Houston?

5 A. No, not at all, nothing.

6 Q. And did potential for flooding
7 come up at all with regard to your
8 consideration of the property that you
9 purchased?

10 A. No.

11 Q. Had you looked into whether the
12 property had flooded before, before you made
13 the purchase?

14 A. No. But, actually -- no, not
15 before.

16 Q. And before you made the
17 purchase of the property, had you ever heard
18 of the Addicks Reservoir and the Barker
19 Reservoir?

20 A. (Moving head side to side.)

21 No.

22 Q. Could you say that --

23 A. No.

24 Q. -- for the court reporter?

25 A. No.

1 Q. And at the time you purchased
2 the property, were you aware of the existence
3 of the waterway called Buffalo Bayou?

4 A. No.

5 Q. Mrs. Godejord, what is your
6 educational background?

7 A. I have a degree in fine arts.

8 Q. And are you presently employed?

9 A. No. I'm a housewife.

10 Q. So just for the record, do you
11 have any specialized education in hydrology?

12 A. No.

13 Q. Or how about residential
14 appraisals?

15 A. No. It's just fine arts.

16 Q. And have you ever worked for
17 the Army Corps of Engineers?

18 A. No.

19 Q. Have you ever worked for the
20 United States government?

21 A. No, never.

22 Q. So when you purchased your home
23 in 2008, what was the reason why you -- what
24 was the use that you were going to make of
25 the home?

Mr. Jeremy E. Good

July 19, 2018

Page 1

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE UPSTREAM ADDICKS §

AND BARKER (TEXAS) §

FLOOD-CONTROL RESERVOIRS § SUB-MASTER DOCKET

§ NO. 17-cv-9002L

§

§ Chief Judge Susan G. Braden

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

§

ORAL DEPOSITION

MR. JEREMY E. GOOD

July 19, 2018

ORAL DEPOSITION OF MR. JEREMY E. GOOD, produced
as a witness at the instance of the United States and
duly sworn, was taken in the above-styled and
numbered cause on the 19th day of July, 2018, from

a.m. to 12:23 p.m., before Michelle Hartman, 9:00
Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Raizner Slania, LLP, 2402 Dunlavy Street, Houston,
Texas 77006, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached hereto.

1 Q. That's fine. It is somewhere in the
2 two documents. We can double-check that it might be
3 Salamar II?

4 A. II, could be.

5 Q. That's fine.

6 A. Yes, thank you.

7 Q. And who are the principles of that
8 entity?

9 A. I have to check the names. I know the
10 wife's name is Lu-Lu and I would have to look back on
11 my correspondence on who the husband's name is.

12 Q. What diligence did you do in looking at
13 this property when you made this purchase?

14 A. I would say we did what would be normal
15 due diligence looking into the property and any of
16 the details that go into purchasing a home or
17 investment property.

18 Q. Did they provide you financial
19 information showing you their incumbent expenses
20 associated with the property?

21 A. There were some documents that they --
22 went back and forth. My wife does a lot more of the
23 details on the numbers, being a CPA, me being the
24 musician; so she would be able to answer that better
25 than I am, but I'm sure there was some information

1 that gave us at least a ballpark of what the numbers
2 were on the property.

3 Q. What other factors did you consider in
4 deciding to purchase this property, was it primarily
5 the income and expense positive cash flow that you
6 saw?

7 A. Yes. I think the fact, too, that it's
8 in Houston. It is in a great spot between Katy and
9 downtown; it's in the West Houston area close to the
10 City Center as well there at Katy -- or, excuse me,
11 at I-10 and the Katy Freeway, I-10 and Beltway 8. So
12 we thought it would be a good investment.

13 Q. Any other factors you considered?

14 A. Not to my recollection.

15 Q. Now, at the time that you purchased it,
16 I assume you were aware of the Addicks Reservoir and
17 Dam?

18 A. I was aware of the area but not fully
19 aware of exactly how everything worked out there as
20 far as what the dam was; but yes, I was aware of it.

21 Q. What did you understand at that time?

22 A. I understood that it appeared from my
23 knowledge that this was a large area. As a matter of
24 fact, we used to go ride our bikes there. Because
25 the Terry Hershey empties into it, we would go ride

1 our bikes in the area, and I thought it was an
2 overflow area if the storms ever got very, very bad.

3 Q. And did you understand that South --
4 does South Mayde Creek run close to the front of
5 your -- of the 760 property?

6 A. The Buffalo Bayou.

7 Q. Is that Buffalo Bayou, or what, runs
8 down through the park directly in front of you?

9 A. I'm not sure which bayou of water that
10 is, what that's called.

11 Q. What is the park name then?

12 A. That is Terry Hershey right there.

13 Q. So the water, that runs through Terry
14 Hershey?

15 A. Yes.

16 Q. And do you understand that that -- I
17 will refer to it as a "stream."

18 A. Yeah.

19 Q. -- that that stream flows from the
20 gates that release -- that release the water from the
21 Addicks Reservoir?

22 A. I was not fully aware that that's where
23 the source was.

24 Q. When you purchased it?

25 A. Correct.

1 Q. At some point did you become aware of
2 that?

3 A. Yeah, we did. After the dam was
4 opened, we realized that that's where the water was
5 coming from.

6 Q. After the Harvey event?

7 A. After the Addicks release, after the
8 damages were released, yeah.

9 Q. Yeah, during the Harvey event --
10 because I mean, there may -- was there ever any
11 releases from the dam after you owned it prior to
12 August of 2017 that you're aware of?

13 A. Not that I -- I'm not alone. I don't
14 know the answer to that.

15 Q. As you sit here today, you don't recall
16 ever seeing any other -- being aware of any other
17 releases from the Addicks Reservoir into the stream
18 that goes through the Terry Hershey Park before
19 August?

20 A. There may have been; there may not have
21 been. Unless I'm a primary resident, so -- I'm not
22 there on a daily basis, so I'm not aware.

23 Q. How often do you visit -- over the
24 course of your ownership, how often do you visit?

25 A. I'm typically in the area and I will

Peggy Hollis

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1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO)
5 ALL DOWNSTREAM CASES)

6
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8 ORAL DEPOSITION OF

9 PEGGY HOLLIS

10 JULY 19, 2018
11 -----

12 ORAL DEPOSITION OF PEGGY HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 12:57 p.m. to
16 1:48 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.
23
24
25

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<p style="text-align: right;">Page 6</p> <p>1 Q. Very nice.</p> <p>2 And any grandchildren in the area?</p> <p>3 A. We do. We have a granddaughter who is 11 that</p> <p>4 lives here in Houston; and we have two grandsons in</p> <p>5 Dallas, 6 and 9.</p> <p>6 Q. Very nice.</p> <p>7 And since you moved here in 1969, have --</p> <p>8 have you been here in the Houston area continuously?</p> <p>9 A. I have.</p> <p>10 Q. And I didn't ask your husband this, but when</p> <p>11 did you get married?</p> <p>12 A. 1969.</p> <p>13 Q. Okay. And aside from your work with Delta</p> <p>14 Airlines, have you ever been in the military or worked</p> <p>15 for the United States?</p> <p>16 A. No.</p> <p>17 Q. And never done any work for the Army Corps of</p> <p>18 Engineers?</p> <p>19 A. No.</p> <p>20 Q. I want to go back and ask a couple of questions</p> <p>21 about your first couple homes in the Houston area.</p> <p>22 So your husband described your first home</p> <p>23 in Ashford Hollow that you moved into in 1969; is that</p> <p>24 correct?</p> <p>25 A. Correct.</p>	<p style="text-align: right;">Page 8</p> <p>1 Q. Very nice.</p> <p>2 And you know with -- with schools being a</p> <p>3 primary consideration and certainly with children, I</p> <p>4 understand that.</p> <p>5 At the time you purchased the home, were</p> <p>6 you aware of the existence of Addicks and Barker</p> <p>7 Reservoirs and dam?</p> <p>8 A. Maybe to some extent, but at that time in my</p> <p>9 life, I didn't think about things like that. So I'll</p> <p>10 have to say no, I didn't.</p> <p>11 Q. Okay.</p> <p>12 A. That was not a part of my buying the house. I</p> <p>13 didn't think about it.</p> <p>14 Q. So did you have any concerns about -- about</p> <p>15 flood risk in that neighborhood when you purchased it?</p> <p>16 A. No. Never. Huh-uh.</p> <p>17 Q. And do you recall at the time you purchased the</p> <p>18 home in December 1983 -- I think your husband said you</p> <p>19 closed on it in January 1984; is that correct?</p> <p>20 A. Correct.</p> <p>21 Q. Do you recall whether there was any discussion</p> <p>22 about flood risk as part of the purchase process?</p> <p>23 A. No. With our mortgage company, they required</p> <p>24 that you, you know, have that. But I think that's just</p> <p>25 a common thing, you know, that you have to do when you</p>
<p style="text-align: right;">Page 7</p> <p>1 Q. And during the years that you were in that</p> <p>2 home, your husband described that you didn't have any</p> <p>3 experience with flooding in that home.</p> <p>4 A. No.</p> <p>5 Q. During the years that you lived there, did you</p> <p>6 observe any flooding in -- in the neighborhood where</p> <p>7 that home is located?</p> <p>8 A. No.</p> <p>9 Q. And then how about your second home on Honey --</p> <p>10 Honeywood Trail?</p> <p>11 A. Right.</p> <p>12 Q. During the years that you were there, did you</p> <p>13 observe any flooding in that neighborhood?</p> <p>14 A. No.</p> <p>15 Q. And your husband described kind of the process</p> <p>16 of finding your current home. Do you agree with the</p> <p>17 testimony he gave this morning about that search?</p> <p>18 A. I did. I had looked in that area for quite a</p> <p>19 while because we had lived -- we had lived there so</p> <p>20 long, so I was familiar with the area. And I knew it</p> <p>21 had good schools, which was our main priority. And I</p> <p>22 had seen the house that was for sale many, many times</p> <p>23 and -- driving through the neighborhood and, of course,</p> <p>24 fell in love with it. And it happened to go into an</p> <p>25 estate, and that's how we were able to buy it.</p>	<p style="text-align: right;">Page 9</p> <p>1 get a mortgage is to take out that insurance.</p> <p>2 Q. And that was going to be my very next question</p> <p>3 because I think your husband wasn't sure about whether</p> <p>4 it was required. Is it your recollection that your</p> <p>5 mortgage company did require flood insurance?</p> <p>6 A. I say that, but can I backtrack again?</p> <p>7 Q. Sure.</p> <p>8 A. You know, it's been so many years ago. I can't</p> <p>9 say that when we first bought the house that we had to</p> <p>10 have flood insurance immediately; but sometime during</p> <p>11 the point that we had a mortgage, we did have to have</p> <p>12 flood insurance. But I can't honestly say exactly when</p> <p>13 that was.</p> <p>14 Q. Okay. And have you maintained flood insurance</p> <p>15 on your home since that time?</p> <p>16 A. I have.</p> <p>17 Q. And have you renewed that policy since this</p> <p>18 flood?</p> <p>19 A. Yes.</p> <p>20 Q. Okay. And I had asked your husband some</p> <p>21 questions about changes in your policy premiums over</p> <p>22 time, and he said you might know that. But do you</p> <p>23 recall whether there's been any changes?</p> <p>24 A. There has been. When -- when flood insurance</p> <p>25 first came, you know, out that, you know, we were going</p>

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1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
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4 _____) 17-cv-9002L
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6 ALL DOWNSTREAM CASES)

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8 ORAL DEPOSITION OF

9 WAYNE HOLLIS

10 JULY 19, 2018
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12 ORAL DEPOSITION OF WAYNE HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 8:59 a.m. to
16 12:13 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.

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<p style="text-align: right;">Page 14</p> <p>1 A. Yes.</p> <p>2 Q. Do you own any other property, residential</p> <p>3 property in the Houston area?</p> <p>4 A. Yes.</p> <p>5 Q. And where is that property?</p> <p>6 A. I have a commercial operation that has a home,</p> <p>7 two-bedroom house on it, Baytown, Texas. It's under</p> <p>8 Hollis Marine. I rent out dock space and rent the house</p> <p>9 occasionally.</p> <p>10 Q. So is that on the lake or on the shore?</p> <p>11 A. No. It's on Galveston Bay, saltwater.</p> <p>12 Q. And did that home also experience some -- some</p> <p>13 flooding or any damage from Hurricane Harvey?</p> <p>14 A. No.</p> <p>15 Q. And from the review of some documents that</p> <p>16 you've provided, I understand you purchased your home on</p> <p>17 River Forest Drive in January of 1984; is that correct?</p> <p>18 A. December of 1983, and closed in January of '84.</p> <p>19 Q. Got it. Thank you.</p> <p>20 And aside from the period following</p> <p>21 Hurricane Harvey which we'll discuss today, have you and</p> <p>22 your wife lived in that home since you closed in January</p> <p>23 1984?</p> <p>24 A. Yes, contiguously we've lived there.</p> <p>25 Q. Okay. And do you recall how much you paid for</p>	<p style="text-align: right;">Page 16</p> <p>1 So the school district was a motivating</p> <p>2 factor for your decision?</p> <p>3 A. Yes.</p> <p>4 Q. Okay. Any -- any other factors besides the</p> <p>5 style of the house and the school district that</p> <p>6 influenced your decision to buy in the neighborhood?</p> <p>7 A. No.</p> <p>8 Q. Let me take out a map.</p> <p>9 (Exhibit 1 marked.)</p> <p>10 MR. HARTMAN: Mr. Hollis, I just want to</p> <p>11 tell you that if you check out the compass star, north</p> <p>12 is pointing left, the orientation.</p> <p>13 THE WITNESS: Yes, I -- I see that. And</p> <p>14 east is north.</p> <p>15 MS. TARDIFF: A little confusing.</p> <p>16 Q. (BY MS. TARDIFF) So what we've marked as</p> <p>17 Deposition Exhibit 1 -- let me see if my glasses fail me</p> <p>18 here. The Bates Number is Harris 0000459. The second</p> <p>19 page is Harris 0000453. And I'll represent to you,</p> <p>20 Mr. Hollis, that this is some excerpts from the</p> <p>21 subdivision plats for your neighborhood.</p> <p>22 So am I correct that your neighborhood is</p> <p>23 known as Nottingham Forest?</p> <p>24 A. Nottingham Forest 8.</p> <p>25 Q. Nottingham Forest 8. So are there a number of</p>
<p style="text-align: right;">Page 15</p> <p>1 the property in 1984?</p> <p>2 A. Yes, I do. We paid 200,000 for it.</p> <p>3 Q. And what area of Houston were you living in</p> <p>4 before you purchased your home in 1984?</p> <p>5 A. In that same area, about a mile south of where</p> <p>6 we are now.</p> <p>7 Q. Did that neighborhood have a name, do you</p> <p>8 recall?</p> <p>9 A. Ashford -- the Ashford area. The Ashford</p> <p>10 Hollow, I guess you'd call it.</p> <p>11 Q. And were you owning or renting there?</p> <p>12 A. I owned that home.</p> <p>13 Q. Okay. Any experience with flooding at that</p> <p>14 home while you owned it?</p> <p>15 A. No, none.</p> <p>16 Q. So tell me a little bit about the process of --</p> <p>17 of finding the home that you purchased in December of</p> <p>18 1983, closed in January 1984.</p> <p>19 A. Our son was just going into junior high. And</p> <p>20 we lived in the Houston HISD school district, and we</p> <p>21 wanted to move into the Spring Branch school district.</p> <p>22 And my wife, being from the south, Alabama, found this</p> <p>23 colonial home that looked like Alabama and insisted we</p> <p>24 purchase it.</p> <p>25 Q. It does have that look, I agree.</p>	<p style="text-align: right;">Page 17</p> <p>1 Nottingham Forest neighborhoods?</p> <p>2 A. Yeah. Yes, there is.</p> <p>3 Q. So when you tell people what neighborhood you</p> <p>4 live in, do you just say Nottingham Forest or...</p> <p>5 A. No. We add the 8.</p> <p>6 Q. Add the 8. Okay.</p> <p>7 And looking at the first page here, do you</p> <p>8 recognize the location of -- of your parcel under the</p> <p>9 Forest?</p> <p>10 A. I assume -- I assume it's number 13 -- no,</p> <p>11 number 12. Yeah, because there's this house -- yeah,</p> <p>12 number 12.</p> <p>13 Q. I think you're correct. So I'm going to go</p> <p>14 ahead and help. And let's -- I'm just going to kind of</p> <p>15 put a red box around that.</p> <p>16 So that's the location of your property</p> <p>17 within Nottingham Forest Section 8?</p> <p>18 A. Yes.</p> <p>19 Q. Very good. Were there other features of -- of</p> <p>20 the neighborhood? You talked about the school district,</p> <p>21 the -- the look of the house. Were there any other</p> <p>22 features of Nottingham Forest Section 8 that influenced</p> <p>23 your decision to buy the home here?</p> <p>24 A. Just a very nice part of West Houston.</p> <p>25 Q. At the time you purchased, were you aware of</p>

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<p style="text-align: right;">Page 18</p> <p>1 the -- the proximity of -- of your home and the</p> <p>2 neighborhood to Buffalo Bayou?</p> <p>3 A. Yes.</p> <p>4 Q. And was that a factor in your decision to</p> <p>5 purchase the home at all?</p> <p>6 A. Well, from my understanding, the dams were</p> <p>7 built to protect us, and we always relied on that</p> <p>8 theory.</p> <p>9 Q. And so you're aware of both the -- the Addicks</p> <p>10 and Barker Reservoirs and dam at the time?</p> <p>11 A. Very aware.</p> <p>12 Q. Okay. And this question probably requires you</p> <p>13 to take a guess. But about -- about how far is your --</p> <p>14 your parcel from kind of the -- the edge of the green</p> <p>15 space where Buffalo Bayou is located?</p> <p>16 A. We're probably about a quarter of a mile to a</p> <p>17 third of a mile from the actual flow of the bayou.</p> <p>18 Q. And does your neighborhood have -- well, let</p> <p>19 me -- let me back up and ask a preliminary question. I</p> <p>20 understand there is a -- a bike path that runs along the</p> <p>21 bayou near your neighborhood; is that right?</p> <p>22 A. That's correct. Greenbelt and a -- and a bike</p> <p>23 trail.</p> <p>24 Q. Okay. And does -- does your neighborhood</p> <p>25 have -- have access to that -- that bike path?</p>	<p style="text-align: right;">Page 20</p> <p>1 space or the bike path at all?</p> <p>2 A. No, I do not use any of it.</p> <p>3 Q. All right. We'll set that -- this aside for</p> <p>4 now, and we'll probably come back to it if we need it</p> <p>5 for reference.</p> <p>6 A. Okay.</p> <p>7 Q. So at the time that you were looking at the</p> <p>8 home and purchasing, were you using a real estate agent?</p> <p>9 A. Yes.</p> <p>10 Q. And did the real estate agent have any</p> <p>11 discussions with you about flood risk for this property</p> <p>12 at the time?</p> <p>13 A. It had never flooded.</p> <p>14 Q. It had never flooded before your purchase?</p> <p>15 A. Correct.</p> <p>16 Q. And you were told that by the real estate</p> <p>17 agent?</p> <p>18 A. Correct.</p> <p>19 Q. Did the real estate agent disclose whether you</p> <p>20 were in a -- in a flood zone?</p> <p>21 A. Disclosed we were in the 500-year floodplain.</p> <p>22 Q. And did you have an understanding at that time</p> <p>23 as to what that meant?</p> <p>24 A. Yes.</p> <p>25 Q. And what was your understanding?</p>
<p style="text-align: right;">Page 19</p> <p>1 A. Yes.</p> <p>2 Q. And how do you access it?</p> <p>3 A. You access it by going down and crossing</p> <p>4 Bramblewood and some access points at different streets</p> <p>5 that dead end to that green space.</p> <p>6 Q. So looking at the first page, for example,</p> <p>7 would you go down Nottingham Oaks Trail and does that</p> <p>8 provide you access to the green space? At the top of --</p> <p>9 A. No. You have to go down -- yeah, Nottingham</p> <p>10 Oaks Trail. And there's an access there, and then</p> <p>11 there's an access at Dairy Ashford. And then there's an</p> <p>12 access that doesn't show on this map. Where River</p> <p>13 Forest makes a turn to the north here, there's another</p> <p>14 street that Carolcrest goes across and there's an access</p> <p>15 there.</p> <p>16 Q. So if you look at the second page of what we've</p> <p>17 marked as your Deposition Exhibit 1, are those access</p> <p>18 points shown on that map?</p> <p>19 A. I can't see that. I actually can't see that.</p> <p>20 But I can't read the name of the street, but...</p> <p>21 Q. It is very small.</p> <p>22 A. Yeah. But there's an access at five or six</p> <p>23 different points there where the streets dead end into</p> <p>24 the green space.</p> <p>25 Q. And is that -- do you -- do you use the green</p>	<p style="text-align: right;">Page 21</p> <p>1 A. That we would not flood.</p> <p>2 Q. And at the time you purchased your home, did</p> <p>3 you have a mortgage on the home?</p> <p>4 A. Yes, we did.</p> <p>5 Q. Did your mortgage holder require that you</p> <p>6 insure the home?</p> <p>7 A. Yes.</p> <p>8 Q. Did they also require that you have flood</p> <p>9 insurance on the home?</p> <p>10 A. I don't think they required, but we had it.</p> <p>11 Q. And so did you purchase flood insurance from</p> <p>12 the beginning?</p> <p>13 A. Yes.</p> <p>14 Q. And had -- did you maintain that flood</p> <p>15 insurance --</p> <p>16 A. Well, maybe they required it. They did require</p> <p>17 it. I think the mortgage company required flood</p> <p>18 insurance, I think. I don't -- I don't truly recall.</p> <p>19 Q. Have you maintained flood insurance on the</p> <p>20 property since -- since you closed on it in January of</p> <p>21 1984?</p> <p>22 A. Yes, we have.</p> <p>23 Q. Okay. And aside from the claim that you made</p> <p>24 after Harvey, have you ever had to make another claim on</p> <p>25 your flood insurance policy?</p>

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<p style="text-align: right;">Page 94</p> <p>1 Q. So during the seven or eight years that you 2 lived there, did you ever experience any flooding? 3 A. It never flooded. 4 Q. And do you know whether that property flooded 5 as a result of the release from the Addicks and Barker? 6 A. Yes, I do. It flooded. 7 Q. Do you have any idea to what degree? 8 A. I went by there, and I think it was 2 to 9 3 feet. 10 Q. Okay. I'd ask you about your current property, 11 but I think we talked about that at -- at some length. 12 One thing that you had mentioned, earlier 13 you had spoken about the -- putting in the drainage 14 ditch and adding gutters. And you also mentioned that 15 there was a seepage issue. 16 Can you just clarify for me that -- the 17 order of those things? Was the seepage issue before or 18 after you built the gutters in the -- 19 A. The seepage issue was before. When we bought 20 the house, if we had a heavy rain, it seeped in. The 21 house did not have gutters, nor the drainage ditch. And 22 I made a swale in the backyard. Had a contractor and 23 did the concrete-lined ditch down the east side of the 24 house to drain to the street. 25 Q. And did you have any seepage issues after that?</p>	<p style="text-align: right;">Page 96</p> <p>1 A. Yes, sir. 2 Q. And do you recall what your response was? 3 A. Yes. I said Houston is flat as a pancake, and 4 I don't know if that would have existed without the 5 dams. 6 Q. And I just want to clarify. Is that -- is that 7 based on any experience in hydrology or in -- in flood 8 management or anything to that nature? 9 A. No, sir. Because the dams were built before I 10 was born. 11 Q. Understood. I also just want to clarify. 12 You -- I believe in one of our e-mails -- and I 13 apologize. I don't -- sorry. 14 In Exhibit 5, you mentioned that the dams 15 were going to be released at 2:00 a.m. Did you have any 16 personal knowledge about when the dams were going to be 17 released? 18 A. No. That was hearsay from a newscast. 19 Q. That was the blip you mentioned on the screen? 20 A. Yes, the little blip. And it didn't say they 21 were opening them. They said they may open them. 22 Q. Okay. That's good. That actually brings me to 23 another question I had. You -- pardon me. 24 So in Exhibit 5, you mentioned that you 25 thought they were going to open Addicks Dam wide open.</p>
<p style="text-align: right;">Page 95</p> <p>1 A. No, sir. 2 Q. I want to ask you a little bit about your 3 knowledge of the dams. So have you had any involvement 4 with the Addicks and Barker Reservoirs in your 5 professional capacity? 6 A. Yes, I have. 7 Q. Can you tell me just a little bit about that? 8 A. I've rented equipment to contractors working on 9 the dam over the last 30 years. I have equipment rented 10 in there to date on replacing the outflow gates. At the 11 present time, Granite Construction out of Watsonville, 12 California, I think, is their home office. 13 Q. Okay. 14 A. But yes, I have been -- have many contractors 15 over the years worked in the Addicks and Barker 16 Reservoirs. 17 Q. When you were moving to your -- your current 18 house, was some of your awareness of the reservoirs as a 19 result of that professional experience? 20 A. Yes. 21 Q. Now, a little bit earlier today, I believe 22 my -- my colleague asked a question about what would 23 have happened in terms of the development of the area 24 had the Addicks and Barker Reservoirs not been built. 25 Do you recall that question?</p>	<p style="text-align: right;">Page 97</p> <p>1 Was that something that you experienced before that you 2 were aware of where they had fully opened the gates at 3 the dam? 4 A. Yes. 5 Q. You believe that had happened previously while 6 you've lived there? 7 A. Yes. I -- I don't know what degree they opened 8 them, but that's what we've been told, that they were 9 previously opened. 10 Q. And had you flooded in those instances? 11 A. No. That's when Bramblewood flooded there the 12 first time. 13 Q. Okay. So you -- did you have an expectation 14 that the house would flood if the gates were opened? 15 A. No, we did not. 16 Q. And can you tell me, how much notice did you 17 have that the dams were going to be opened? 18 A. We had no notice other than the little TV blip 19 that allegedly they were going to open. 20 Q. And was that on the evening of August 27th? 21 A. Yes. Because we evacuated -- 22 Q. That was Sunday. 23 A. -- morning -- or noon, the 28th, yes. 24 Q. So you were first made aware during the evening 25 news on the 27th?</p>

25 (Pages 94 - 97)

Wayne Hollis

July 19, 2018

<p style="text-align: right;">Page 98</p> <p>1 A. Yes.</p> <p>2 Q. I did want to clarify one thing. And you know,</p> <p>3 we can actually use Exhibit 16 to -- to clarify.</p> <p>4 You had discussed earlier the flow of water</p> <p>5 that you experienced on the 29th and the 30th when you</p> <p>6 were returning to your home as moving from the north to</p> <p>7 southeast; is that correct? Northwest to southeast?</p> <p>8 A. Yes, northwest to southeast.</p> <p>9 Q. Can you mark on this exhibit the direction that</p> <p>10 you experienced the water flowing?</p> <p>11 A. What color? Red?</p> <p>12 Q. Black, if you would. I think that's what we</p> <p>13 used on the other -- on the other exhibit.</p> <p>14 A. The water -- the water came across the</p> <p>15 neighborhood like this.</p> <p>16 Q. And did that water meet up with the bayou</p> <p>17 further downstream?</p> <p>18 A. Well, it was all one contiguous body of water.</p> <p>19 Q. Okay. Understood.</p> <p>20 MS. TARDIFF: Could -- just -- and I don't</p> <p>21 want to interrupt your questioning. But just for the</p> <p>22 record, could you make that black line into an arrow?</p> <p>23 MR. HARTMAN: Yeah. That's an excellent</p> <p>24 idea. Uh-huh.</p> <p>25 MS. TARDIFF: Just for clarity. Thank you.</p>	<p style="text-align: right;">Page 100</p> <p>1 Q. You think you would have noticed that amount of</p> <p>2 gap even with the carpet covering it?</p> <p>3 A. Sure. Stepping on the carpet, you would have</p> <p>4 fallen through.</p> <p>5 Q. And I just want to ask you a couple last</p> <p>6 questions about where we are now. So we've talked a lot</p> <p>7 about -- about the repairs that you've done to the home.</p> <p>8 Is -- am I correct in understanding that those are still</p> <p>9 ongoing?</p> <p>10 A. Yes, correct.</p> <p>11 Q. So is there a -- a full tally of what the costs</p> <p>12 are going to be to get sort of back to where you were?</p> <p>13 A. No. We're adding costs daily.</p> <p>14 Q. And I also want to clarify. So you moved in</p> <p>15 with your son shortly after -- in fact, immediately</p> <p>16 after you evacuated, correct?</p> <p>17 A. Immediately after.</p> <p>18 Q. And you have been with him since late August of</p> <p>19 last year?</p> <p>20 A. Yes.</p> <p>21 Q. Are you paying rent to your son?</p> <p>22 A. We paid him \$6,000 up front in October or so to</p> <p>23 do some work, make it more comfortable for us. And</p> <p>24 that's the only rent I've paid him.</p> <p>25 Q. Have you helped out in any other ways, picking</p>
<p style="text-align: right;">Page 99</p> <p>1 A. (Witness complies.)</p> <p>2 Q. (BY MR. HARTMAN) Thank you, Mr. Hollis.</p> <p>3 I just wanted to clarify because I know we</p> <p>4 talked about several foundations, and I want to make</p> <p>5 sure we've got them all straight. Have you had any</p> <p>6 foundation issues in your home before Hurricane Harvey?</p> <p>7 A. We're one of the few homes in the neighborhood</p> <p>8 that has never had foundation problems, nor has had to</p> <p>9 repair. Ours was built evidently on pier and beam or</p> <p>10 something. I wasn't there for the construction, but</p> <p>11 it's a very solid foundation.</p> <p>12 Q. And you didn't have any foundation issues on</p> <p>13 the home after the flooding either?</p> <p>14 A. Other than the little separation from the</p> <p>15 chimney from -- which is outside the foundation of the</p> <p>16 home.</p> <p>17 Q. And so the -- the foundation crack that we were</p> <p>18 looking at, that was in the separate garage; is that</p> <p>19 correct?</p> <p>20 A. That was in the garage.</p> <p>21 Q. And you hadn't seen that crack at least before?</p> <p>22 A. We had seen a hairline, but it was covered with</p> <p>23 carpet. And then when it opened up, as we went in back</p> <p>24 after the floodwaters, pulled the carpet, it was 6,</p> <p>25 7 inches wide at that time.</p>	<p style="text-align: right;">Page 101</p> <p>1 up utilities or anything like that?</p> <p>2 A. Yes. We just bought him a new stove, different</p> <p>3 things. I've repaired some stuff. Had some contractors</p> <p>4 working to improve, and he didn't want any more payment.</p> <p>5 Q. Understood. That's a good son. I hope my</p> <p>6 folks' place never floods.</p> <p>7 A. He is ready for us to leave. We're overdue.</p> <p>8 Q. Understood.</p> <p>9 MR. HARTMAN: Well, I think that that is</p> <p>10 all I have.</p> <p>11 FURTHER EXAMINATION</p> <p>12 BY MS. TARDIFF:</p> <p>13 Q. So let me ask a few follow-up questions, if I</p> <p>14 could, just for clarification on some things.</p> <p>15 A. Sure.</p> <p>16 Q. Thank you.</p> <p>17 So the second home that you lived in on</p> <p>18 Honeywood Trail, you said that was adjacent to Buffalo</p> <p>19 Bayou?</p> <p>20 A. It's about 400 yards from Buffalo Bayou.</p> <p>21 Q. Okay. So did -- did your property actually</p> <p>22 come right up to the -- the edge of the green space</p> <p>23 or...</p> <p>24 A. No. No. We -- three houses between us and</p> <p>25 then a big office building and then the bayou on Dairy</p>

26 (Pages 98 - 101)

Page 1

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE UPSTREAM ADDICKS)
AND BARKER (TEXAS))
FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
_____) 17-cv-9002L
THIS DOCUMENT RELATES TO)
ALL DOWNSTREAM CASES)

ORAL DEPOSITION OF

ARNOLD MILTON

JULY 10, 2018

ORAL DEPOSITION OF ARNOLD MILTON, produced as a witness at the instance of the United States, and duly sworn, was taken in the above-styled and numbered cause on the 10th day of July, 2018, from 9:02 a.m. to 2:48 p.m., before Morgan Veletzuy, CSR in and for the State of Texas, recorded by machine shorthand, at Fleming, Nolen & Jez, 2800 Post Oak Boulevard, Suite 4000, Houston, Texas 77056, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed before any notary public.

1 Q. What else attracted you to this particular
2 home?

3 A. We liked it because it was fairly small and we
4 only had one daughter.

5 Q. Was the school district a factor in your
6 decision?

7 A. No. We knew we were going to Kinkaid.
8 Actually, we went to St. Francis with her first and then
9 on to Kinkaid. And both of those schools were just off
10 of Memorial. And when I went to work downtown I drove
11 right past them so it was easy to take the daughter to
12 school in the morning.

13 Q. Was there anything else about the home or the
14 neighborhood that was a factor in your decision?

15 A. Not really.

16 Q. Was flooding a concern for you when you were
17 purchasing the home?

18 A. No. We really didn't think about it. I was
19 aware of the dams, but there hadn't been any problem
20 that we were aware of out there, so...

21 The first few years we were in the house we
22 bought flood insurance religiously, and after about
23 38 years we tended to forget about it. And that's what
24 happened to us on the last one. We actually discussed
25 it and my wife almost did it and then we got busy and

1 forgot about it and we got caught.

2 Q. I'll come back to questions about the details
3 about the flood insurance.

4 Going back to the time of the purchase, you
5 said you were aware of the dams. Can you describe for
6 me what your level of awareness was?

7 A. Well, I knew they were big, long, earthen dams.
8 And I knew Loop 6 crossed Addicks to the north and
9 Westheimer went south of Barker Cypress. And, of
10 course, that dam was west of Highway 6, south of I-10
11 too. So I just knew they were large. And I can
12 remember my father saying years ago that Memorial
13 wouldn't have been developed without those dams.

14 Q. Do you recall approximately when your father
15 said that?

16 A. No. It was probably in the '50s.

17 Q. So when you were young?

18 A. Uh-huh.

19 Q. Do you think your father's correct?

20 A. Oh, yeah. If you've ever looked at the 1975
21 flood pictures of downtown Houston, you'd know.

22 Q. Going back to your awareness of the dams prior
23 to purchasing, did you know what their names were?

24 A. I guess I did. It seemed like I've known their
25 names forever. But I feel fairly certain I didn't know

1 the names back then. It's been a long time.

2 Q. So you think you were aware of the dams when
3 you were growing up in Houston?

4 MR. HOBBS: Objection; form.

5 A. Again, I don't -- that's a long time ago. I
6 remember my father saying that, that's about it.

7 Q. (BY MR. LEVINE) Given your educational and
8 vocational background, do you think that gave you any
9 greater appreciation for the dams' function?

10 A. Well, being an Army engineer I've designed
11 drainage ditches and stuff like that for combat roads,
12 but that was about the extent of my deep thinking about
13 that particular problem. It's not something we thought
14 a lot about. We just kind of took it for granted that
15 those dams were there to protect that part of town.

16 Q. When you say the dams were there to protect
17 that part of town, what part of town are you referring
18 to specifically?

19 A. Well, basically all of the town I should say,
20 but fairly down from our direction at least it was the
21 west side from where we lived.

22 Q. Having worked for and served in the Army Corps
23 of Engineers -- let me ask that question differently.
24 Sorry.

25 Were you aware at the time you were

1 purchasing the home in 1978 that the Army Corps of
2 Engineers operated Addicks and Barker dams?

3 A. I don't remember if I was or not. I may have
4 been; I may not have. I just -- I don't think I was
5 actually. But it's just a guess.

6 Q. Do you recall at what point approximately you
7 might have become aware that the Army Corps of Engineers
8 operated Addicks dam and Barker dam?

9 A. Well, I became much more focused on that during
10 the flood of course, with all the TV that was going on
11 and everybody was trying to figure out who to blame.
12 And that's when I really realized that it was a
13 federally operated situation. The Corps of Engineers
14 was operating it.

15 Q. When you say "during the flood," which flood
16 are you referring to?

17 A. Harvey.

18 Q. And when we talk about Harvey, what -- what do
19 you think that storm was?

20 MR. HOBBS: Objection; form.

21 A. It was a hurricane.

22 Q. (BY MR. LEVINE) Do you know the approximate
23 time frame of when that hurricane occurred?

24 A. Well, of course, we -- we got flooded on the
25 28th of August. So I guess it developed in the

Virginia Milton

July 10, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
 2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
 3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
 4 _____) 17-cv-9002L
 5 THIS DOCUMENT RELATES TO)
 6 ALL DOWNSTREAM CASES)

7 -----
 8 ORAL DEPOSITION OF

9 VIRGINIA MILTON

10 JULY 10, 2018
 11 -----

12 ORAL DEPOSITION OF VIRGINIA MILTON, produced
 13 as a witness at the instance of the United States, and
 14 duly sworn, was taken in the above-styled and numbered
 15 cause on the 10th day of July, 2018, from 3:14 p.m. to
 16 5:00 p.m., before Morgan Veletzuy, CSR in and for the
 17 State of Texas, recorded by machine shorthand, at
 18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
 19 Suite 4000, Houston, Texas 77056, pursuant to the
 20 Federal Rules of Civil Procedure and the provisions
 21 stated on the record or attached hereto; that the
 22 deposition shall be read and signed before any notary
 23 public.
 24
 25

1 the tax day flood, whatever all of the other areas --
2 floods that happened in Houston that weren't necessarily
3 flood-related. Sometimes bad thunderstorms.

4 Q. (BY MR. LEVINE) Would you say that Houston is
5 prone to flooding?

6 MR. HOBBS: Objection; form.

7 A. I would not because we never flooded, so I
8 would have never been concerned.

9 Q. (BY MR. LEVINE) Would you say you're aware of
10 previous flooding events in Houston?

11 MR. HOBBS: Is that a question?

12 A. Is that -- is that -- is that -- you're
13 asking -- I'm sorry?

14 Q. (BY MR. LEVINE) Yes. Are you aware of
15 previous flooding events in Houston?

16 A. Yes.

17 Q. Do you --

18 A. But not near me.

19 Q. Do you recall a storm called Allison?

20 A. Yes.

21 Q. Okay. And did areas of Houston flood during
22 Allison?

23 A. Yes.

24 Q. Do you recall a storm called Ike?

25 A. Yes.

1 Q. Did areas of Houston flood during Ike?

2 A. I don't really recall the areas if there was
3 flooding.

4 Q. Do you remember a flood in May of 2015
5 sometimes referred to as the Memorial Day flood?

6 A. I read about it.

7 Q. Did areas of Houston flood during that Memorial
8 Day storm?

9 A. Yes, but not near me.

10 Q. And you mentioned the tax day flood a moment
11 ago; is that correct?

12 A. Yes.

13 Q. Did -- did areas of Houston flood during tax
14 day?

15 A. Yes, but not near me.

16 Q. Do you know why your neighborhood didn't flood
17 during any of those previous storms we just mentioned?

18 MR. HOBBS: Objection; form.

19 A. No. I'm just glad it didn't.

20 Q. (BY MR. LEVINE) Do you know what Addicks Dam
21 is?

22 A. Yes.

23 Q. Do you know what Addicks Reservoir is?

24 A. I'm assuming they're one and the same.

25 Q. Do you know what Barker Dam is?

1 A. Yes.

2 Q. Do you know what Barker Reservoir is?

3 A. I assume they're one and the same.

4 Q. When you purchased your home, were you aware of
5 Addicks Dam?

6 A. No.

7 Q. When you purchased your home, were you aware of
8 Barker Dam?

9 A. No.

10 Q. Do you know at what point since 1978 you first
11 became aware of Addicks Dam?

12 A. No.

13 Q. Do you know at what point since 1978 you first
14 became aware of Barker Dam?

15 A. No.

16 Q. Do you think Addicks Dam has protected your
17 neighborhood from flooding prior to Hurricane Harvey?

18 MR. HOBBS: Objection; form.

19 A. I don't know.

20 Q. (BY MR. LEVINE) Do you think Barker Dam has
21 protected your home from flooding prior to Hurricane
22 Harvey?

23 A. I don't know.

24 MR. HOBBS: Same objection.

25 Q. (BY MR. LEVINE) Prior to purchasing the home

1 on Silvergate, were you aware of any flooding in that
2 neighborhood?

3 A. No.

4 Q. Where did you grow up?

5 A. I grew up on a ranch between Refugio and
6 Victoria, Texas, 150 miles south of here.

7 Q. Growing up, do you remember hearing about
8 flooding in Houston?

9 A. No.

10 Q. Do you remember how you first became aware of
11 Addicks and Barker Dams?

12 A. No.

13 MR. HOBBS: Objection; asked and answered.

14 A. I don't remember how I became aware.

15 Q. (BY MR. LEVINE) What's your present
16 understanding of what Addicks and Barker Dams do?

17 A. My understanding is that the two dams were
18 built to protect the City of Houston and the Port of
19 Houston to protect the commerce.

20 Q. And how did you come to that understanding?

21 A. From what I've been told and from what I've
22 read.

23 Q. Do you know where you've read those things?

24 A. No. I read a lot.

25 Q. Do you read the news?

Jennifer Shipos

September 19, 2018

Page 1

THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE: DOWNSTREAM ADDICKS)
AND BARKER (TEXAS))
FLOOD-CONTROL RESERVOIRS)
) SUB-MASTER DOCKET NO.
) 17-CV-90021
)

ORAL DEPOSITION OF

JENNIFER SHIPOS

September 19, 2018

Volume 1

ORAL AND VIDEOTAPED DEPOSITION OF JENNIFER SHIPOS,
produced as a witness at the instance of the DEFENDANT,
was taken in the above-styled and numbered cause on
September 19, 2018 from 3:02 p.m. to 5:05 p.m., before
Toyloria Lanay Hunter, CSR in and for the State of
Texas, reported by machine shorthand, at the law offices
of NEEL, HOOPER & BANES, P.C., 1800 West Loop South,
Suite 1750, Houston, Texas 77027, pursuant to the
Federal Rules of Civil Procedure and the provisions
stated on the record or attached hereto.

1 Q. From that Thursday up until the 29th, had you
2 heard about the storm increasing in severity?

3 A. Yes, but the media kind of over exaggerates
4 some things, you know. So we knew it had a potential of
5 getting a lot of inches of rain.

6 Q. When you say the media can tend to over
7 exaggerate, have they done that on previous storms?

8 A. I would say occasionally, yes.

9 Q. What did you do to prepare?

10 A. (No response.)

11 Q. I'm sorry. Let me back up.

12 You testified earlier that you had been
13 given notice that they were going to release water from
14 the dams?

15 A. Yes.

16 Q. What -- what exactly are you referring to?

17 A. Well, on the news and also through social
18 media, you know, people texting and people -- you know,
19 updating you that they potentially was going to in the
20 Barkers and the Addicts Reservoir, they were going to
21 start releasing water in accelerated fashion.

22 Q. When you said earlier that you heard about it
23 on social media, did you share texts with people about
24 the --

25 A. Actually, people shared it with me, yes.

1 Q. Shared it with you?

2 A. Uh-huh.

3 Q. Do you know if you saved copies of?

4 A. I don't think I did.

5 Q. What sorts of things did you hear?

6 A. Just the fact that they were -- there was a
7 potential emergency situation. That the -- I mean,
8 there was all kinds of rumors going on. I mean, I
9 couldn't tell you if they were factual or not.

10 Q. Prior to Hurricane Harvey, what was your
11 understanding of the purpose of Addicks Reservoir?

12 A. I mean, my basic and simple understanding of
13 the dam and reservoirs were that they -- you know,
14 operate to basically control the flow of water all the
15 way downtown for the integrity of -- you know, not
16 flooding the areas.

17 Q. And that's for both reservoirs?

18 A. That's my understanding.

19 Q. How did you come to that understanding?

20 A. I've never read about them. I'm not very
21 knowledgeable about them. But that's what's in my
22 simple mind. That's what I thought they were for.

23 Q. And you live about 2/10s of a mile from
24 Buffalo Bayou?

25 A. Yes.

1 Q. When you bought the house, were you aware that
2 it was that close to Buffalo Bayou?

3 A. Yes.

4 Q. Had you heard anything about Buffalo Bayou
5 ever flooding?

6 A. No.

7 Q. Okay. Going back to the notice about the
8 storm coming, what did you do to prepare?

9 A. I mean, I did the typical things. I got --
10 so, you know, I bought water, batteries, you know,
11 thinking more that we'd lose power. And -- you know,
12 just your typical preparation for -- you know, losing
13 power.

14 Q. Did you get any sandbags?

15 A. I did not get any sand, no.

16 Q. Did you do anything with your personal
17 property?

18 A. My contents you mean?

19 Q. Yes.

20 A. I did take up some of my clothes, some of my
21 chairs, anything that I -- I mean, I couldn't lift
22 anything myself. But as much as I could lift, I did.

23 Q. Did you put that -- those things like that on
24 tables?

25 A. I put them upstairs.

Peter Silverman

July 18, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF
9 PETER SILVERMAN
10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF PETER SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 9:06 a.m. to
16 3:52 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.
23
24
25

1 all of the different topographical regions of Texas that
2 they've studied.

3 Q. Understood. So you mentioned earlier that your
4 area I think -- I believe on Westerley Lane was
5 particularly flat. Do you have an understanding of
6 Houston being flat?

7 MR. HODGE: Objection; form.

8 A. I think I was talking about my street being
9 level. But from my personal observations, I would say
10 that Houston is a relatively flat area.

11 Q. (BY MS. IZFAR) Do you have any understanding
12 of the soil in Houston?

13 MR. HODGE: Objection; form.

14 A. I have no particular understanding. Every now
15 and then my wife will get soil and bring it to Cornelius
16 Nursery and ask, you know, what -- what do I need to do
17 to grow my plants better and things such like that. But
18 nothing as far as -- as far as the soil here.

19 Q. (BY MS. IZFAR) So you mentioned earlier that
20 the Gulf Coast is particularly prone to torrential
21 rainfall events. Do you have any understanding as to
22 how much rainfall Houston gets per year?

23 A. No.

24 Q. When you moved here and when you were looking
25 for homes, did -- was flood risk a concern at all?

1 A. No.

2 Q. Why was it not a concern?

3 A. I moved here when I was 25 years old, and I
4 moved here looking for a place to live convenient to my
5 work and my social life and things like that. It was
6 not part of my equation. It was not part of my equation
7 when I was looking to -- I mean, I moved here for a job,
8 for employment, not -- not for lifestyle or to live
9 here. So I never thought about it.

10 Q. So prior to Harvey had you ever heard of
11 Addicks and Barker?

12 A. I had heard those terms. There are streets
13 around me named Addicks and Barker, Barker Cypress,
14 Addicks Howell. So I was familiar, in general, with
15 those terms in that area.

16 Q. Had you heard of Addicks dam?

17 A. Not in particular to a dam. I had heard more
18 likely of, you know, of reservoirs and the like. But
19 never -- I never considered a dam, like, in particular.

20 Q. So you had heard of Addicks Reservoir, though?

21 A. Yes.

22 Q. And had you heard of Barker Reservoir?

23 A. I get the two confused. And so I've probably
24 driven by Barker Reservoir thinking that that was
25 Addicks Reservoir. And I had driven over Addicks

1 Reservoir thinking that that was like Bear Creek or
2 something like that. So I had heard about these things
3 in general but never in particular.

4 Q. Had you ever visited any of the reservoirs?

5 A. I had driven over, I think, what is Addicks
6 Reservoir because there is major roads in Houston that
7 go over the reservoir. So if that's called visiting,
8 driving over them. And --

9 Q. Had you ever visited, like, Bear Creek Park or
10 any of the parks?

11 A. I had been in the Bear Creek Park for an hour
12 for a Boy Scout ceremony once. But not a whole lot of
13 time there.

14 Q. What was your understanding of how the
15 reservoirs functioned?

16 A. I had no understanding about how the reservoirs
17 functioned.

18 Q. Okay. Did you have any understanding as to
19 what they -- what their purpose was?

20 A. No. And the reason I answer no is if you had
21 told me I lived near a reservoir, my assumption would
22 have been that that's where you store water that you
23 then drink. And I don't think that's the purpose of
24 these reservoirs. So what I would have assumed if you
25 asked me about the reservoir that I lived near, would

1 have been wrong. So I was -- I obviously did not have
2 knowledge of what they were for.

3 Q. Okay. So when did you first learn that -- or
4 did you -- did there come a time when you learned that
5 Addicks and Barker served a flood-risk reduction
6 purpose?

7 MR. HODGE: Objection; form.

8 A. Post this incident, I have learned that they
9 should serve that purpose for certain areas of Houston
10 or certain locations of Houston. Post this incident, I
11 learned that they were built in regards to Downtown
12 Houston due to flooding that occurred to Downtown
13 Houston, I think, at the turn of the century or
14 somewhere near there. So I always -- so I learned that
15 they had a use of having to do with the commercial
16 center of Houston.

17 Q. (BY MS. IZFAR) When you say you learned, how
18 did you acquire this knowledge?

19 A. From television or articles that -- that said
20 the -- that the work was done following a bad flood to
21 Downtown Houston at the turn of the century and that
22 this is what they did to prevent future Downtown Houston
23 flooding.

24 Q. Did you -- do you recall the names of any of
25 the articles?

Zhennia Silverman

July 18, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
 2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
 3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
 4 _____) 17-cv-9002L
 5 THIS DOCUMENT RELATES TO)
 6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
 8 ORAL DEPOSITION OF

9 ZHENNIA SILVERMAN

10 JULY 18, 2018
 11 -----

12 ORAL DEPOSITION OF ZHENNIA SILVERMAN, produced
 13 as a witness at the instance of the United States, and
 14 duly sworn, was taken in the above-styled and numbered
 15 cause on the 9th day of July, 2018, from 4:05 p.m. to
 16 5:34 p.m., before Morgan Veletzuy, CSR in and for the
 17 State of Texas, recorded by machine shorthand, at 1200
 18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
 19 to the Federal Rules of Civil Procedure and the
 20 provisions stated on the record or attached hereto; that
 21 the deposition shall be read and signed before any
 22 notary public.
 23
 24
 25

1 Harvey?

2 A. I don't. And I have no idea what the rain --
3 you know, what that incident was like, because I wasn't
4 here. And so I have no idea what the water was like.
5 And I know that it rained really hard on July 4th, but I
6 was in New York working. And so, again, I mean, I've
7 just missed out on -- on being able -- I mean, I can't
8 gauge.

9 Q. Right. Do you ever recall a rain event where
10 there were consecutive days of rain?

11 A. Yes. And I don't know if it was 2015 or 2016,
12 but it rained for a really long time. And, you know,
13 the water in the bayou rose, but, I mean, we didn't have
14 any problems; nothing happened to our home. And I
15 remember they actually told us to stay home, which is
16 really a miracle. And so my husband and I, we just
17 drove around and, you know, just kind of drove around
18 and looked at -- you know, looked at the water and
19 stuff. But there was nothing near our home.

20 Q. Do you have any -- any estimate as to how deep
21 the channel is for Buffalo Bayou right outside your
22 neighbor's home?

23 A. No. And I will tell you that in the 28 years
24 that we've lived there, I have never so much as crossed
25 the street and gotten as far as my husband did to look

1 in my neighbor's backyard.

2 Q. Do you ever go to Hershey Park?

3 A. I have. I have walked those trails in the
4 past. Yeah, no, I have.

5 Q. And how -- and do you look at Buffalo Bayou
6 when you walk those trails?

7 A. Yes. I mean, because it's right -- it's right
8 to the right of the trail. And so I will -- I mean, I
9 will look at it. I like to go because it's such a
10 beautiful green space and the vegetation. But I've
11 never walked it when -- I mean, the water is usually
12 really low, so -- from the times that I've walked it.

13 Q. Okay. What do you know about Addicks and
14 Barker?

15 A. All I can tell you is that's the name of the
16 Park & Ride. I mean, I really do not -- I couldn't tell
17 you which one is which. I know I've driven over it to,
18 like, get to someone's house. But I don't really know
19 anything about them.

20 Q. Do you, sitting here now, have any
21 understanding as to what their function is?

22 A. I really can't say that I do. I remember while
23 being still in Paris reading up on it and reading up on,
24 you know, when they were built and why they were built
25 and, you know, sort of to -- you know, keep the water

1 from flooding downtown and River Oaks, I think is what I
2 had read. But I really -- I don't know anything about
3 the dam.

4 Q. Do you have any understanding as to whether
5 they have protected your home from flooding?

6 A. No.

7 Q. You say that during Harvey your home did not
8 flood at all -- or maybe -- I don't want to put words in
9 your mouth.

10 A. Okay. So I was in Paris and I had been
11 communicating with my husband. And I remember him
12 telling me -- calling me and telling me that -- that,
13 you know, that we were good. That we were -- that we
14 had -- you know, that he was -- that there was no
15 electricity, that he was going to my sister's for a nap
16 and a shower and a meal, and that all was good. And he
17 forwarded that photo to me when he drove away.

18 Q. Okay. Do you have any understanding as to why
19 your home had not flooded as of the 27th?

20 A. No. I mean, I just know that, you know, it had
21 rained. But that, you know, we had not -- there had
22 been no -- you know, no water had come in through the
23 weep holes and so we were good. And my main concern
24 was -- so when my husband told me that he was leaving,
25 my main concern was that, you know -- you know, here I

1 am overseas and I'm like, Did you bring the family photo
2 albums? And he's like, No, we're fine. We're okay, you
3 know. And so -- so yeah.

4 Q. Okay. Have you heard of the Harris County
5 Flood Control District before?

6 A. Yes, I've heard of it. I've heard it, you
7 know, maybe mentioned on the news, or...

8 Q. Have you ever visited their website before?

9 A. No.

10 Q. Okay. Have you ever signed up for any sort of
11 warning systems from local government as to flooding?

12 A. No.

13 Q. Do you know if your husband has?

14 A. No, I don't.

15 Q. Okay. Prior to Harvey, had you ever read
16 anything about Addicks and Barker?

17 A. No.

18 Q. Had you ever read anything about flooding in
19 Houston?

20 A. No, not particularly. I mean, maybe I saw a
21 headline or I saw a news segment, but it was not
22 something that was sort of a venturous to me because I
23 didn't really feel affected by it. So I -- it's not
24 something that I, you know, looked into or read about.

25 Q. Do you know how the gates on Addicks and Barker

Timothy Stahl

September 5, 2018

Page 1

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM)
ADDICKS AND BARKER) Sub-Master Docket
(TEXAS) FLOOD-CONTROL) No. 17-cv-9002L
RESERVOIRS)

ORAL DEPOSITION OF

TIMOTHY STAHL

SEPTEMBER 5, 2018

ORAL DEPOSITION of TIMOTHY STAHL, produced as a witness at the instance of the Defendant, and duly sworn, was taken in the above-styled and numbered cause on September 5, 2018, from 10:10 a.m. to 2:52 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of NEEL, HOOPER & BANES, P.C., 1800 West Loop South, Suite 1750, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

1 width of your property was 25 feet, and it looks like
2 that's exactly what's shown here; is that correct? If
3 you look at the --

4 A. Yeah. Sure is. 25 feet. All right. Great.

5 Q. So you were right on the money there.

6 A. Although 26 in the back, I suppose. But this
7 doesn't go to the center of the creek like the verbal
8 description.

9 Q. Oh, the light blue line, that's not the
10 center of the creek?

11 A. I don't think so. I think the center of the
12 creek is this dotted line. Well, maybe not. I don't
13 know. The creek certainly doesn't seem to go that
14 high on a regular basis, this other dotted line.

15 Q. Yeah. Looks like there's a dotted line on
16 each side.

17 A. Yeah. On each side. I don't know.

18 Q. Okay. All right. But 1C is -- is your
19 property?

20 A. It is, yes.

21 Q. All right.

22 (Exhibit No. 24 was marked.)

23 Q. (BY MS. TARDIFF) I've put in front of you
24 what's marked deposition Exhibit 24. Are you familiar
25 with this document?

1 A. I have not seen this document.

2 Q. Okay. If you have not seen it then I will
3 not ask you questions about it then. So this isn't a
4 document you had prepared in connection with your sale
5 of the property?

6 A. Not in connection to the sale of the
7 property, no.

8 Q. Do you know if this was prepared in
9 connection with your claim here?

10 A. I'm certain it was.

11 MR. BANES: Represent that it was.

12 MS. TARDIFF: Okay. Very good.

13 Q. (BY MS. TARDIFF) Mr. Stahl, on the first page
14 here --

15 MR. BANES: This is our -- this is the
16 expert report from Mr. Stahl's property on damages.

17 MS. TARDIFF: Okay. Very good.

18 Q. (BY MS. TARDIFF) Mr. Stahl, did you
19 participate in the property inspection on June 26th,
20 2018?

21 A. Participate in the fact that I opened the
22 door and answered questions when asked, yes.

23 Q. Very good. All right. Since you haven't
24 seen that, I will not ask you questions about it.
25 Mr. Stahl, at the time you purchased your property in

1 October, 2007, you described for me your familiarity
2 with the neighborhood from having grown up in that
3 area. Were you aware at that time of the presence of
4 Addicks and Barker reservoirs and dam?

5 A. I knew they existed.

6 Q. What did you know at the time you purchased
7 the property about what those dams and reservoirs do?

8 A. They retained some water.

9 Q. Have -- have you ever -- prior to purchasing
10 your property, did you look up any information about
11 those reservoirs?

12 A. Not really, no.

13 Q. You've described for me a number of storms
14 since you purchased the property in 2007 where the
15 water level did rise up to your air-conditioning unit
16 beneath your deck. Do you have a belief as to whether
17 the water level during those storms would have been
18 higher on your property if -- if it wasn't for the
19 existence and operation of those Addicks and Barker
20 dams?

21 A. I don't know.

22 MR. BANES: Objection; form.

23 Q. (BY MS. TARDIFF) Is flooding a fairly regular
24 occurrence in Houston?

25 MR. BANES: Objection; calls for

1 speculation.

2 A. I don't know.

3 Q. (BY MS. TARDIFF) I want to ask you a few
4 follow-up questions about your purchase of the home.
5 You had described talking to your neighbor about
6 flooding and his observations. Did you have any
7 concerns about floodwaters on your property at the
8 time of your -- at the time you purchased it?

9 A. Floodwaters on property being dirt or
10 floodwaters on property being structure.

11 Q. Well, let's start with the dirt on the land
12 itself.

13 A. There's a creek that was active year round,
14 so there's always water there.

15 Q. So you were aware of -- of that risk of the
16 water coming up at least on the land at the time you
17 purchased?

18 A. I'm aware of risk of water being a foot deep
19 in the creek.

20 Q. And when you say "a foot deep in the creek,"
21 are you talking in the creek bed or a foot deep on
22 your land?

23 A. The creek is about a foot deep. When I
24 bought the property, the creek was about a foot deep.
25 When I looked and inspected the property, the creek

DEPOSITION OF JANA CANAN BEYOGLU

DEPOSITION AND ANSWERS of JANA CANAN BEYOGLU, taken before Edith A. Boggs, a certified shorthand reporter in Harris County for the State of Texas, taken at the law offices of Neel, Hooper & Banes, PC, 1800 West Loop South, Suite 1750, Houston, Texas, on the 18th day of September, 2018, between the hours of 1:49 p.m. and 5:06 p.m.

1 Q. And during -- from 2005 when you bought it
2 until when you sold it, only you and your husband owned
3 the property; is that right?

4 A. That's correct.

5 Q. Do you recall if they were -- well, what kind
6 of documents did you receive when you purchased the
7 house in 2005?

8 A. I don't know. I don't remember.

9 Q. Do you remember getting disclosures of the
10 house?

11 A. I'm sure we did.

12 Q. Okay. Do you remember if they disclosed any
13 issues with let's say plumbing?

14 A. No, I don't recall.

15 Q. Or termite -- issues with like termites?

16 A. When we were buying it, no.

17 Q. What about anything about flooding?

18 A. No.

19 Q. So, as far as you know, the property had never
20 flooded when you purchased it?

21 A. No.

22 Q. Okay. And your Maplewood house where you
23 lived, did that house ever flood?

24 A. No.

25 Q. Prior to Maplewood, you lived somewhere else.

1 Q. What area?

2 A. Meyerland area, that I know, not -- I don't
3 remember in other areas.

4 Q. Okay. You said your area floods a lot?

5 A. No.

6 MR. BANES: Meyerland.

7 A. Meyerland.

8 Q. (BY MS. SANTACRUZ) Oh, okay. Is that in
9 Turkey?

10 A. No.

11 MR. BANES: No. That's here in Houston.

12 Q. (BY MS. SANTACRUZ) Okay. I'm sorry.

13 A. That's all I know. I have friends there.

14 So --

15 MR. BANES: It's south of here on 610.

16 A. 610.

17 Q. (BY MS. SANTACRUZ) Okay. Thank you.

18 A. Thank you.

19 Q. So, that area you know floods?

20 A. That's how I -- yes.

21 Q. Okay.

22 A. Yeah.

23 Q. But not in Maplewood where you've lived or in
24 this area?

25 A. No.

1 Q. Yes.

2 A. Yes.

3 Q. So, you knew it was there?

4 A. Uh-huh.

5 Q. What did you know about the bayou at that time?

6 A. It was a nice bayou that you can run or walk or
7 ride a bicycle.

8 Q. Did you ever see any water or that it was
9 flooded or had any water in there?

10 A. I didn't, no.

11 Q. Was that -- what did you think was the use for
12 the bayou other than to use it for recreational
13 purposes?

14 A. I didn't know.

15 Q. You didn't think there was a possibility that
16 the bayou would overflow or flood?

17 A. No, I didn't.

18 Q. Not when you were purchasing the home?

19 A. No.

20 Q. Not after Hurricane Ike?

21 A. No.

22 Q. So --

23 A. I didn't think that it would affect us or
24 anything. Which I didn't think that because of Harvey
25 that it -- I don't know -- it got too much water.

1 Q. So, during Hurricane Ike, you did not see --
2 did you hear about the Buffalo Bayou having any water or
3 overflowing?

4 A. I don't remember, to be honest with you. I
5 don't remember.

6 Q. Well, let's talk about something more recent
7 because Ike happened a while ago. Tax day flood, have
8 you heard of tax day flood?

9 A. I heard them, uh-huh.

10 Q. Okay.

11 A. But not in my area.

12 Q. It did not flood anything in your area?

13 A. No.

14 Q. None of the houses in your neighborhood
15 flooded?

16 A. As far as I know, no.

17 Q. And the streets near where you live, did any of
18 them flood?

19 A. Gessner right here, it floods right here
20 because of, I guess, the elevation and then it comes
21 this -- right here, it comes a little bit lower and it
22 does but it goes away immediately. I mean, it doesn't
23 stay flooded for days or anything.

24 Q. So, you were pointing from north to south --

25 A. North to south.

John Britton

July 16, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE: UPSTREAM ADDICKS)

 AND BARKER (TEXAS))

3 FLOOD-CONTROL RESERVOIRS)

4) CASE NO. 17-cv-9002L

5 THIS DOCUMENT RELATES TO:)

6 ALL DOWNSTREAM CASES)

7
8 ORAL DEPOSITION

9 JOHN BRITTON

10 30(B)(6) MEMORIAL SMC INVESTMENT 2013, LP

11 JOHN BRITTON

12
13 ORAL 30(b)(6) DEPOSITION OF JOHN BRITTON,
14 Memorial SMC Investment 2013, LP, produced as a
15 witness at the instance of the JOHN BRITTON and duly
16 sworn, was taken in the above-styled and numbered
17 cause on the 16th day of July, 2018, from 9:10 a.m.
18 to 2:19 p.m., before Shauna Foreman, Certified
19 Shorthand Reporter in and for the State of Texas,
20 reported by computerized stenotype machine at the
21 offices of Vinson & Elkins, 1001 Fannin, Suite 2500,
22 Houston, Texas, pursuant to the Federal Rules of
23 Civil Procedure and the provisions stated on the
24 record or attached hereto.

John Britton

July 16, 2018

Page 34	Page 36
<p>1 drainage on how they would ultimately fix the</p> <p>2 location of the buildings in terms of height and</p> <p>3 drain the buildings. And we looked at the title</p> <p>4 policy to determine if there were any encumbrances on</p> <p>5 the title that would prevent the development.</p> <p>6 Q. All right. And who were your civil</p> <p>7 engineers?</p> <p>8 A. Walter P. Moore.</p> <p>9 Q. What's the last name?</p> <p>10 A. Moore, M-O-O-R-E.</p> <p>11 Q. At the time that you were doing this</p> <p>12 analysis, were you aware of the proximity to the</p> <p>13 Addicks Dam?</p> <p>14 A. I mean, we were aware that the dams were</p> <p>15 there. Growing up in Houston, you know, the dams</p> <p>16 have been there my entire life. So --</p> <p>17 Q. And had there been ever any analysis</p> <p>18 performed that related to the potential for releases</p> <p>19 from the -- from the dam?</p> <p>20 A. No.</p> <p>21 MR. McNEIL: Well, before you go any</p> <p>22 further, analysis by whom?</p> <p>23 MR. DAIN: Anyone that he knew of.</p> <p>24 Q. (BY MR. DAIN) I'm talking about your</p> <p>25 knowledge.</p>	<p>1 Q. Did your civil engineer ever raise any</p> <p>2 concerns about the proximity of the property to the</p> <p>3 Buffalo Bayou?</p> <p>4 A. No.</p> <p>5 Q. Was there any discussions with your civil</p> <p>6 engineers about the proximity of the site to the</p> <p>7 Buffalo Bayou?</p> <p>8 A. Not to my knowledge. Again, we looked at</p> <p>9 where the -- the height -- the elevation of the</p> <p>10 property relative to the flood zone, and that's kind</p> <p>11 of the biggest thing you look at in Houston, Texas.</p> <p>12 Again, we verified that there were no</p> <p>13 encumbrances on the title. And then in formulating a</p> <p>14 final elevation with the civil engineer, we relied on</p> <p>15 their calculations and ended up building this several</p> <p>16 feet above the hundred-year flood plain. We were not</p> <p>17 quite to the 500-year flood plain level, but pretty</p> <p>18 close.</p> <p>19 Q. And had you been aware of any instance in</p> <p>20 which the property had ever been flooded</p> <p>21 historically?</p> <p>22 A. No.</p> <p>23 Q. Were you, at the time you purchased, aware</p> <p>24 of any instance in which South Mayde Creek had ever</p> <p>25 overtopped its banks with water?</p>
Page 35	Page 37
<p>1 MR. McNEIL: Objection. Form.</p> <p>2 A. There was no analysis by Grayco of the dam</p> <p>3 release or anything like that.</p> <p>4 Q. (BY MR. DAIN) Did you look at -- were</p> <p>5 you -- did you ever know or have anybody investigate</p> <p>6 the protocols associated with the operations of the</p> <p>7 dams, as to when they would release water, how much</p> <p>8 water they might release, under what conditions there</p> <p>9 would be releases, factors such as that?</p> <p>10 A. No.</p> <p>11 Q. So, now, you make sure I have my</p> <p>12 phraseology right. There was \$77 million in</p> <p>13 development costs at the time of -- through the time</p> <p>14 of completion of the apartment complex, correct?</p> <p>15 A. Approximately.</p> <p>16 Q. Approximately. Fair enough.</p> <p>17 And in addition to those -- to the</p> <p>18 development costs, had Grayco incurred other costs in</p> <p>19 exploring this investment?</p> <p>20 A. Through completion, that was a</p> <p>21 comprehensive view of the costs. Post-completion, we</p> <p>22 spent probably a couple million dollars more in</p> <p>23 operating deficit carry costs to get it to</p> <p>24 stabilized -- a stabilized level of leasing where it</p> <p>25 was self-sustaining.</p>	<p>1 A. I wasn't specifically aware of that, but</p> <p>2 the creek overtopping its banks doesn't necessarily</p> <p>3 imply that the property that we built and the level</p> <p>4 we built would flood.</p> <p>5 Q. I understand the distinction. I'm just --</p> <p>6 A. So, no, we had no specific -- I had no</p> <p>7 knowledge of prior flooding, but bayous and rivers</p> <p>8 flood in Houston all the time.</p> <p>9 Q. What was the last -- I just didn't hear the</p> <p>10 last part of your phrase.</p> <p>11 A. Bayous and rivers come out of their banks,</p> <p>12 flood in Houston.</p> <p>13 Q. I'm going to just jump -- I'm going to ask</p> <p>14 about some of the types of documents I've seen in the</p> <p>15 production today and just ask some questions</p> <p>16 generically about them so I understand who generates</p> <p>17 them and what they are used for, all right?</p> <p>18 A. Yes.</p> <p>19 Q. I see a document called Box Score. Have</p> <p>20 you seen those?</p> <p>21 A. Yes.</p> <p>22 Q. Okay. What is -- what's the purpose of</p> <p>23 that document?</p> <p>24 A. Box Score is created by our management</p> <p>25 company, generated from the property management</p>

10 (Pages 34 - 37)

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO)
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 DANA CUTTS

9
 JUNE 27, 2018
10 -----

11
12 ORAL DEPOSITION OF DANA CUTTS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 27th day of June, 2018, from 9:07 a.m. to
16 2:55 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at the
18 offices of McGehee, Chang, Landgraf, 10370 Richmond
19 Avenue, Suite 1300, Houston, Texas 77042, pursuant to
20 the Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 A. Just what I saw on the news, that the
2 reservoirs were filling and they were going to have some
3 controlled releases.

4 Q. Okay. And have you received any information
5 from local governments about the reservoirs after
6 Hurricane Harvey?

7 A. Other than what I read in the news that water
8 would be -- was being released for probably several
9 months, no.

10 Q. Okay. Have you ever received information from
11 local governments about Houston being a flood-prone
12 area?

13 A. Well, just what I've seen over the years when
14 they've talked about heavy rains and different parts of
15 Houston flooding like Meyerland, which seems to flood
16 quite a bit. But just that general kind of thing.

17 Q. Has -- do you have knowledge of whether your
18 property has ever flooded?

19 A. Yes, I do have knowledge.

20 Q. Okay. And what is that knowledge?

21 A. It has never flooded.

22 Q. Okay. Do you have knowledge about whether your
23 property has flooded before the time you owned it?

24 A. No, I do not.

25 Q. Okay.

IN THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE UPSTREAM ADDICKS §
AND BARKER (TEXAS) §
FLOOD-CONTROL RESERVOIRS § SUB-MASTER DOCKET

§ NO. 17-cv-9002L

____ §
§ Chief Judge Susan G. Braden

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

____ §

ORAL DEPOSITION

MR. JEREMY E. GOOD

July 19, 2018

ORAL DEPOSITION OF MR. JEREMY E. GOOD, produced
as a witness at the instance of the United States and
duly sworn, was taken in the above-styled and
numbered cause on the 19th day of July, 2018, from

a.m. to 12:23 p.m., before Michelle Hartman, 9:00
Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Raizner Slania, LLP, 2402 Dunlavy Street, Houston,
Texas 77006, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached hereto.

1 Q. And what was -- what was the nature of
2 that flooring?

3 A. Unit A was ceramic tile and Unit C was
4 a wood floor throughout.

5 Q. Since the repairs, are there granite
6 countertops in the units today?

7 A. They are some sort of stone. I believe
8 they are granite, yes.

9 Q. Okay. And what were they before?

10 A. Formica perhaps. I'm not sure exactly
11 what the term was.

12 MR. DAIN: Okay. Let me take a little
13 break and we will be done.

14 MR. WICKERT: Okay.

15 (Recess taken)

16 MR. DAIN: Back on the record.

17 Q. (BY MR. DAIN) Any security cameras on
18 Memorial Mews?

19 A. No.

20 Q. Are you aware of the Memorial Day
21 Flood?

22 A. Peripherally.

23 Q. Okay. No knowledge of the Memorial Day
24 Flood and whether that event had any impact on
25 flooding in your neighborhood, in the Memorial Mews

1 neighborhood?

2 A. I know it did not affect the Memorial
3 Mews neighborhood.

4 Q. Okay. How about the Tax Day Flood, do
5 you have any knowledge about whether the Tax Day
6 Flood had any flooding in the neighborhood near
7 Memorial Mews?

8 A. There was impact for the Tax Day Flood.

see errata - "no impact"

9 Q. Do you know when the building was
10 built?

11 A. In 1980 -- early 1980s. I would have
12 to go back and check the exact records.

13 Q. How many units -- similar units are
14 there at Memorial Mews?

15 A. There are approximately 30-odd -- the
16 number could be within five of that -- unit buildings
17 there on the street.

18 MR. DAIN: All right. No further
19 questions.

20 Sorry for the event. I'm sorry for
21 your losses.

22 THE WITNESS: Thank you.

23 MR. DAIN: Pass the witness.

24 EXAMINATION

25 Q. (BY MR. MCGEHEE) All right. Jeremy, I

CHANGES AND SIGNATURE

PAGE	LINE	CHANGE	REASON
Page 15	Line 5-6	Change "quad mixes" to "quad plexes" due to	
		a mistake in the transcription.	
Page 18	Line 6	Change punctuation from a period to a question mark.	
		Clarification of answer	
Page 19	Line 13	Change "I'm not alone" to "I'm not aware" due to a	
		mistake in the transcription.	
Page 52	Line 9	Change from "the first one really had to do with" to	
		"the first one had nothing to do with" due to a mistake in the	
		transcription	
Page 68	Line 4-5	Take out the words "the breakdown" to read" at that	
		point the spray foam was the most efficient" due to a mistake in	
		transcription	
Page 68	Line 15-16	Change from " all the electrical components were in	
		the safe" to " all the electrical components were safe" due to a mistake	
		in transcription	
Page 90	Line 13	Correction to the date. Change from "2000" to "2017"	
		due to clarification.	
Page 93	Line 4	Change "sometimes" to "sometime" due to mistake in	
		transcription.	
Page 94	Line 19-20	Change from "there would be enough for their rent	
		repairs and enough of" to "there would be enough for repairs and enough	
		of" due to mistake in the transcription.	

CHANGES AND SIGNATURE

PAGE	LINE	CHANGE	REASON
------	------	--------	--------

Page 98	Line 8	Change from "There was impact for the Tax Day Flood" to	
		"There was no impact for the Tax Day Flood" due to mistake in	
		transcription.	

1
2
3
4
5
6
7 I declare under penalty of perjury that the
8 foregoing is true and correct.
9

10 _____
11 MR. Jeremy E. GOOD
12
13

14 SUBSCRIBED AND SWORN TO BEFORE ME, the
15 undersigned authority, by the witness, MR. TERRY E.
16 GOOD, on this the _____ day of
17 _____, 2018.
18

19 _____
20 NOTARY PUBLIC IN AND FOR
21 THE STATE OF _____
22

23 My Commission Expires: _____
24
25

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 WAYNE HOLLIS
10 JULY 19, 2018
11 -----

12 ORAL DEPOSITION OF WAYNE HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 8:59 a.m. to
16 12:13 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.

<p style="text-align: right;">Page 18</p> <p>1 the -- the proximity of -- of your home and the 2 neighborhood to Buffalo Bayou? 3 A. Yes. 4 Q. And was that a factor in your decision to 5 purchase the home at all? 6 A. Well, from my understanding, the dams were 7 built to protect us, and we always relied on that 8 theory. 9 Q. And so you're aware of both the -- the Addicks 10 and Barker Reservoirs and dam at the time? 11 A. Very aware. 12 Q. Okay. And this question probably requires you 13 to take a guess. But about -- about how far is your -- 14 your parcel from kind of the -- the edge of the green 15 space where Buffalo Bayou is located? 16 A. We're probably about a quarter of a mile to a 17 third of a mile from the actual flow of the bayou. 18 Q. And does your neighborhood have -- well, let 19 me -- let me back up and ask a preliminary question. I 20 understand there is a -- a bike path that runs along the 21 bayou near your neighborhood; is that right? 22 A. That's correct. Greenbelt and a -- and a bike 23 trail. 24 Q. Okay. And does -- does your neighborhood 25 have -- have access to that -- that bike path?</p>	<p style="text-align: right;">Page 20</p> <p>1 space or the bike path at all? 2 A. No, I do not use any of it. 3 Q. All right. We'll set that -- this aside for 4 now, and we'll probably come back to it if we need it 5 for reference. 6 A. Okay. 7 Q. So at the time that you were looking at the 8 home and purchasing, were you using a real estate agent? 9 A. Yes. 10 Q. And did the real estate agent have any 11 discussions with you about flood risk for this property 12 at the time? 13 A. It had never flooded. 14 Q. It had never flooded before your purchase? 15 A. Correct. 16 Q. And you were told that by the real estate 17 agent? 18 A. Correct. 19 Q. Did the real estate agent disclose whether you 20 were in a -- in a flood zone? 21 A. Disclosed we were in the 500-year floodplain. 22 Q. And did you have an understanding at that time 23 as to what that meant? 24 A. Yes. 25 Q. And what was your understanding?</p>
<p style="text-align: right;">Page 19</p> <p>1 A. Yes. 2 Q. And how do you access it? 3 A. You access it by going down and crossing 4 Bramblewood and some access points at different streets 5 that dead end to that green space. 6 Q. So looking at the first page, for example, 7 would you go down Nottingham Oaks Trail and does that 8 provide you access to the green space? At the top of -- 9 A. No. You have to go down -- yeah, Nottingham 10 Oaks Trail. And there's an access there, and then 11 there's an access at Dairy Ashford. And then there's an 12 access that doesn't show on this map. Where River 13 Forest makes a turn to the north here, there's another 14 street that Carolcrest goes across and there's an access 15 there. 16 Q. So if you look at the second page of what we've 17 marked as your Deposition Exhibit 1, are those access 18 points shown on that map? 19 A. I can't see that. I actually can't see that. 20 But I can't read the name of the street, but... 21 Q. It is very small. 22 A. Yeah. But there's an access at five or six 23 different points there where the streets dead end into 24 the green space. 25 Q. And is that -- do you -- do you use the green</p>	<p style="text-align: right;">Page 21</p> <p>1 A. That we would not flood. 2 Q. And at the time you purchased your home, did 3 you have a mortgage on the home? 4 A. Yes, we did. 5 Q. Did your mortgage holder require that you 6 insure the home? 7 A. Yes. 8 Q. Did they also require that you have flood 9 insurance on the home? 10 A. I don't think they required, but we had it. 11 Q. And so did you purchase flood insurance from 12 the beginning? 13 A. Yes. 14 Q. And had -- did you maintain that flood 15 insurance -- 16 A. Well, maybe they required it. They did require 17 it. I think the mortgage company required flood 18 insurance, I think. I don't -- I don't truly recall. 19 Q. Have you maintained flood insurance on the 20 property since -- since you closed on it in January of 21 1984? 22 A. Yes, we have. 23 Q. Okay. And aside from the claim that you made 24 after Harvey, have you ever had to make another claim on 25 your flood insurance policy?</p>

<p style="text-align: right;">Page 22</p> <p>1 A. No.</p> <p>2 Q. Okay. Is -- is your home down in -- on</p> <p>3 Galveston Bay also insured with flood insurance?</p> <p>4 A. No.</p> <p>5 Q. And have you ever had any flooding of that</p> <p>6 property before?</p> <p>7 A. Yes. Hurricane Carla wiped us out in '63. And</p> <p>8 other than that, I can't remember what other -- I guess</p> <p>9 Alicia pulled the roof off of it and it rained in it.</p> <p>10 But we're up on 12-foot stilts, and we've never had</p> <p>11 actual flood -- tidal water flood the house.</p> <p>12 Q. And how long has that property been in your</p> <p>13 family?</p> <p>14 A. Since 1952.</p> <p>15 (Exhibit 2 marked.)</p> <p>16 Q. (BY MS. TARDIFF) So, Mr. Hollis, I -- what</p> <p>17 I've marked as Deposition Exhibit 2 is a copy of</p> <p>18 Plaintiff Wayne Hollis, Jr.'s and Peggy Hollis's Answers</p> <p>19 to Defendant's Second Set of Interrogatories.</p> <p>20 And do you recognize this document?</p> <p>21 A. Yes, ma'am.</p> <p>22 Q. And I just wanted to ask you a couple of</p> <p>23 questions about some of your answers here. So let's</p> <p>24 look at page 2 in answer to Interrogatory No. 21. The</p> <p>25 interrogatory, for the record, is: "Identify documents,</p>	<p style="text-align: right;">Page 24</p> <p>1 Construction Company.</p> <p>2 THE REPORTER: Mischer?</p> <p>3 THE WITNESS: Mischer, M-I-S-C-H-E-R,</p> <p>4 Walter Mischer Construction.</p> <p>5 Q. (BY MS. TARDIFF) So at the time you were</p> <p>6 building the roads in this area, describe to me what the</p> <p>7 area looked like in terms of development.</p> <p>8 A. The area was all wooded. There was no</p> <p>9 development out there. Vince Kickerillo was the</p> <p>10 developer, and Mischer was the contractor.</p> <p>11 Q. Okay. So that name is Vince Kickerillo?</p> <p>12 A. Kickerillo.</p> <p>13 Q. And with respect to Nottingham Forest Section</p> <p>14 8, about how long did it take for this -- for the homes</p> <p>15 in the subdivision to be constructed over time?</p> <p>16 A. They started building -- best of my</p> <p>17 recollection, because I left and went in the Air Force.</p> <p>18 And I was there in '64 and '65, and they started</p> <p>19 building the homes, I think, in '67 or '68, after they</p> <p>20 developed the subdivision.</p> <p>21 Q. So when you -- when you returned from your</p> <p>22 military service, what did this area look like?</p> <p>23 A. It was still rural Harris County, not in the</p> <p>24 city of Houston. But it was developing to the west.</p> <p>25 Q. So about how many years would you say it did</p>
<p style="text-align: right;">Page 23</p> <p>1 including internet publications or other information,</p> <p>2 each plaintiff reviewed or other steps taken prior to</p> <p>3 purchasing and releasing their respective test</p> <p>4 properties for the purpose of assessing whether flooding</p> <p>5 was likely on the test property and in determining</p> <p>6 whether to obtain flood insurance."</p> <p>7 So we've already talked about some of those</p> <p>8 issues. But your -- the first sentence -- and let me</p> <p>9 give you time to read that.</p> <p>10 A. Okay.</p> <p>11 Q. So I actually for now want to ask you about the</p> <p>12 second sentence. So it says, "Plaintiffs were aware at</p> <p>13 the time they purchased their home that it had never</p> <p>14 flooded based upon their knowledge of the area and the</p> <p>15 disclosures provided to them as part of the purchase</p> <p>16 transaction."</p> <p>17 So tell me about your knowledge of the area</p> <p>18 at the time of your decision to purchase this home.</p> <p>19 A. Well, I actually built the streets in this</p> <p>20 subdivision in 1964 working for a contractor in Houston.</p> <p>21 And I purchased my first home in 1969 off of Dairy</p> <p>22 Ashford out there. So I've been in the area since 1964.</p> <p>23 Q. So -- so you built the roads actually in this</p> <p>24 subdivision?</p> <p>25 A. Yes, ma'am. In the summer, working for Mischer</p>	<p style="text-align: right;">Page 25</p> <p>1 take to go from kind of the forested area where you</p> <p>2 helped construct roads to what it looks like today?</p> <p>3 A. Probably 10 or 15 years to build out.</p> <p>4 Q. Do you believe this area would have built out</p> <p>5 the way it did without the construction of Addicks and</p> <p>6 Barker dams?</p> <p>7 A. No.</p> <p>8 Q. And why not?</p> <p>9 A. Houston is as flat as a pancake. It -- we got</p> <p>10 no elevation. The reason those dams were built, to my</p> <p>11 understanding, was to keep the city of Houston, the west</p> <p>12 side, from flooding as a whole retention pond.</p> <p>13 Q. And in the years since you've purchased your</p> <p>14 home, have there been storm events where -- where you've</p> <p>15 seen those reservoirs at least maybe -- maybe fill up is</p> <p>16 not the right word, but hold water back?</p> <p>17 A. Oh, that's correct. Yes.</p> <p>18 Q. The second part of the sentence I had read from</p> <p>19 your answer to Interrogatory No. 1 also refers to the</p> <p>20 disclosures provided to you as part of your purchase</p> <p>21 transactions. So I'll look at the documents at the</p> <p>22 break. But aside from the statements made to you by</p> <p>23 your real estate agent, were there any other</p> <p>24 representations made to you as part of your purchase</p> <p>25 about flood risk of the property?</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 VIRGINIA MILTON
10 JULY 10, 2018
11 -----

12 ORAL DEPOSITION OF VIRGINIA MILTON, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 10th day of July, 2018, from 3:14 p.m. to
16 5:00 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 Q. Prior to Hurricane Harvey, had the
2 850 Silvergate property ever flooded?

3 A. No. Not only had it not flooded, it never had
4 a drop of water from any thunderstorm, hurricane, or
5 tropical storm.

6 Q. Did it ever rain on your house during one of
7 those types of events?

8 A. Yes.

9 Q. But water never came onto your property from
10 some other source, is what you're saying?

11 MR. HOBBS: Objection; form.

12 A. We never had any water in our house from any
13 source.

14 Q. (BY MR. LEVINE) So you've never had any water
15 damage to your home from any storm?

16 A. No.

17 Q. Has your roof ever been damaged?

18 A. We've had a couple of leaks -- one in the
19 dining room area, one in the kitchen going into the
20 garage area, from a shingle that got blown off. And so
21 we had -- we didn't realize we had a leak and had the
22 roof fixed. Also, we have a lot of squirrels that are
23 on the roof that do damage. So we have had from that
24 also.

25 Q. You've had water damage from that?

THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE: DOWNSTREAM ADDICKS)
AND BARKER (TEXAS))
FLOOD-CONTROL RESERVOIRS)
) SUB-MASTER DOCKET NO.
) 17-CV-90021
)

ORAL DEPOSITION OF

JENNIFER SHIPOS

September 19, 2018

Volume 1

ORAL AND VIDEOTAPED DEPOSITION OF JENNIFER SHIPOS,
produced as a witness at the instance of the DEFENDANT,
was taken in the above-styled and numbered cause on
September 19, 2018 from 3:02 p.m. to 5:05 p.m., before
Toyloria Lanay Hunter, CSR in and for the State of
Texas, reported by machine shorthand, at the law offices
of NEEL, HOOPER & BANES, P.C., 1800 West Loop South,
Suite 1750, Houston, Texas 77027, pursuant to the
Federal Rules of Civil Procedure and the provisions
stated on the record or attached hereto.

1 in order to have homeowners association -- or no. I
2 mean -- we just never were required. I think some areas
3 are required.

4 Q. When you -- since you've owned it, have you
5 ever had flood insurance?

6 A. Two years now.

7 Q. And so when did you first have flood
8 insurance?

9 A. Well, I guess I just renewed it for the third
10 time in July. So it would have been, let's see. Maybe
11 July of 2016.

12 Q. What company is that with?

13 A. Allstate.

14 Q. When you bought it in 2016, why did you buy
15 it?

16 A. Well, I'd never had any kind of water. Like,
17 we went through Allison. We went through Ike. Never
18 had a problem at all. The tax flood day, it did come up
19 in the yard. And that was probably -- you know. To the
20 extent -- you know, that I had seen water, you know, it
21 was enough where we couldn't pull our cars in.

22 So -- but then it went right back out. So
23 that was the first time I thought maybe this would be a
24 good idea. But we do live in Houston, so. . .

25 Q. How much do you pay for flood insurance?

1 A. Yes, it is.

2 Q. And Paragraph 5 -- now, when did you do this?

3 A. March --

4 Q. March 28th?

5 A. -- 28th.

6 Q. 2018?

7 A. Yeah.

8 Q. Paragraph 5, that's your view of what happened
9 to your house?

10 A. Yes.

11 Q. Now, with respect to the market values on
12 these appraisals or the appraised values, do you agree
13 with -- do you agree with the market value on this -- on
14 this -- on these sheets?

15 A. Between these two? Or --

16 Q. For any of them.

17 A. (Reading.) I don't know the answer to that.

18 Q. I notice that between 2016 and 2017, the land
19 value doesn't change at all?

20 A. Correct.

21 Q. Do you agree with that?

22 A. Not necessarily, but I don't know.

23 Q. Well, the property was flooded.

24 Was never flooded before 2017, was it?

25 A. No.

1 Q. But it was flooded during 2017?

2 A. Yes.

3 Q. There's nothing in here reflecting that
4 anything like that ever happened?

5 A. Right.

6 Q. I got one last question now, ma'am.

7 A. Okay.

8 Q. If your -- let's say the dams would not have
9 been there. Let's just assume the dams were never
10 there. Would your purchase decision for the home have
11 been the same?

12 MR. DOOHER: Objection; calls for
13 speculation.

14 BY MR. BANES:

15 Q. You can answer if you know.

16 A. If -- would I have bought the property right
17 here?

18 Q. Yeah. Exhibit 1, where it's located.

19 A. If the dams were not --

20 Q. Right.

21 A. I would say I would not have bought the
22 property.

23 Q. Okay.

24 MR. BANES: Nothing further.

25 EXAMINATION

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM)
ADDICKS AND BARKER) Sub-Master Docket
(TEXAS) FLOOD-CONTROL) No. 17-cv-9002L
RESERVOIRS)

ORAL DEPOSITION OF
TIMOTHY STAHL
SEPTEMBER 5, 2018

ORAL DEPOSITION of TIMOTHY STAHL, produced as a witness at the instance of the Defendant, and duly sworn, was taken in the above-styled and numbered cause on September 5, 2018, from 10:10 a.m. to 2:52 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of NEEL, HOOPER & BANES, P.C., 1800 West Loop South, Suite 1750, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

1 A. No, ma'am, it had not.

2 Q. Did the possibility of flooding present any
3 concerns to you at the time you decided to purchase?

4 A. Because --

5 MR. BANES: Objection to form.

6 You can go ahead.

7 A. Because it was not in the hundred-year
8 floodplain and I had firsthand primary source
9 experience with living right next door for the last 30
10 something years, I felt safe. There was no concern
11 about flooding.

12 Q. (BY MS. TARDIFF) At the time of your closing
13 on the property, were there any disclosures -- well,
14 let me step back.

15 Did you talk to the seller of the property at
16 all about flooding before you purchased?

17 A. No, ma'am. The seller was less than inclined
18 to talk to anybody.

19 Q. Okay. So no opportunity to talk to the
20 seller?

21 A. Not until closing where she slid a key across
22 the table.

23 Q. Okay. And at your closing, was there any
24 disclosure from the seller about any flooding of
25 either the home itself or the -- the land between the

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS
3 AND BARKER (TEXAS)
4 FLOOD-CONTROL RESERVOIRS Sub-Master Docket No.
17-cv-9001L

5
6 Judge Charles F. Lettow

7 THIS DOCUMENT RELATES TO:
8 ALL UPSTREAM CASES
9

10 ORAL DEPOSITION OF VAL ALDRED
11 AUGUST 1, 2018
12
13

14 ORAL DEPOSITION OF VAL ALDRED, produced as a
15 witness at the instance of the Defendant and duly
16 sworn, was taken in the above styled and numbered
17 cause on Wednesday, August 1, 2018, from 8:58 a.m.
18 to 3:31 p.m., before Rene White Moarefi, CSR, CRR,
19 RPR in and for the State of Texas, reported by
20 computerized stenotype machine, at the offices of
21 Potts Law Firm, 3737 Buffalo Speedway, Suite 1900,
22 Houston, Texas, pursuant to the Federal Rules of
23 Civil Procedure and any provisions stated on the
24 record herein.
25

<p style="text-align: right;">Page 34</p> <p>1 A. Other than the garage?</p> <p>2 Q. Is it an attached garage?</p> <p>3 A. It is.</p> <p>4 Q. Okay. And in your backyard, do you have</p> <p>5 a swimming pool?</p> <p>6 A. Yes.</p> <p>7 Q. And those were all built around 1973,</p> <p>8 1974?</p> <p>9 A. The pool was there when we bought it.</p> <p>10 I'm not sure when it was built. I assume the garage</p> <p>11 was built at the same time the house was.</p> <p>12 Q. Okay. I think we've discussed some</p> <p>13 renovations already that you've done. I think you</p> <p>14 described painting and new carpet, a new countertop</p> <p>15 for your kitchen, and an upgrade of the master</p> <p>16 bedroom -- or master bath in 2012. Are there any</p> <p>17 other changes to your house that we haven't</p> <p>18 discussed?</p> <p>19 A. When you say "changes," from when to</p> <p>20 when?</p> <p>21 Q. From the time you purchased your home in</p> <p>22 1997 until August of 2017 before Harvey, I just want</p> <p>23 to get a general understanding of the kind of</p> <p>24 improvements that you made to your house --</p> <p>25 A. Sure.</p>	<p style="text-align: right;">Page 36</p> <p>1 Q. Okay. Have you ever treated your home</p> <p>2 for termites?</p> <p>3 A. Yes.</p> <p>4 Q. When was that?</p> <p>5 A. Probably about eight years ago.</p> <p>6 Q. So around 2010?</p> <p>7 A. That's pretty fair, I think.</p> <p>8 Q. Have you ever performed any foundation</p> <p>9 work?</p> <p>10 A. No.</p> <p>11 Q. Other than that one time in 2010 when you</p> <p>12 treated your home for termites, have you ever had a</p> <p>13 flare-up afterwards?</p> <p>14 A. No.</p> <p>15 Q. Okay. Have you ever replaced your roof?</p> <p>16 A. Yes.</p> <p>17 Q. When was that?</p> <p>18 A. I think sometime around 2003.</p> <p>19 Q. Okay. Have you ever upgraded any of your</p> <p>20 appliances?</p> <p>21 A. Yes. In 2012, we bought a brand-new</p> <p>22 washer and dryer and refrigerator and maybe even a</p> <p>23 dishwasher and a built-in microwave oven in the</p> <p>24 kitchen. Hot water tank somewhere along the way.</p> <p>25 Q. Prior to Harvey, had your house ever</p>
<p style="text-align: right;">Page 35</p> <p>1 Q. -- to understand the condition it was in.</p> <p>2 A. Gotcha. Okay. So let's see. In the --</p> <p>3 the family room, we removed the existing parquet</p> <p>4 flooring and put in new -- you know, wood flooring</p> <p>5 that was more modern.</p> <p>6 Q. When was that done?</p> <p>7 A. In 2012.</p> <p>8 Q. Okay.</p> <p>9 A. Let's see. We -- we did the bathroom, as</p> <p>10 we talked about. Other than painting, let's see.</p> <p>11 We might have upgraded the closets, at least my</p> <p>12 wife's closet, with California Closets. The</p> <p>13 downstairs, we had -- we had taken the -- the</p> <p>14 existing carpeting and tiled the living room, the --</p> <p>15 the entryway, and the dining room, and the hallway.</p> <p>16 That's about it.</p> <p>17 Q. Okay. Do you have any wood rot on your</p> <p>18 property?</p> <p>19 A. Probably.</p> <p>20 Q. How long has that -- how long have you</p> <p>21 had wood rot?</p> <p>22 A. Well, it -- you know, as far as -- as far</p> <p>23 as I can tell, any -- the only place it would be</p> <p>24 would be behind the garage, and that's only because</p> <p>25 I just happened to see it a couple of weeks ago.</p>	<p style="text-align: right;">Page 37</p> <p>1 flooded?</p> <p>2 A. Not like Harvey had. We'd gotten some</p> <p>3 water in once back in 2009 after a heavy rainstorm</p> <p>4 that just barely crept in from -- from the driveway.</p> <p>5 Q. Were you there -- living in the home</p> <p>6 during 2009?</p> <p>7 A. I was. It happened in -- it happened</p> <p>8 sometime around April of 2009.</p> <p>9 Q. I want to direct your attention to</p> <p>10 Exhibit 3.</p> <p>11 A. Which one is that one?</p> <p>12 Q. The floor plan.</p> <p>13 A. Okay.</p> <p>14 Q. Looking at that floor plan, can you</p> <p>15 identify where the water crept in?</p> <p>16 A. From Harvey?</p> <p>17 Q. Sorry. From the 2009 rains.</p> <p>18 A. From the -- from the right-hand side</p> <p>19 where the driveway would be, dining room and the</p> <p>20 kitchen and then around the back to the breakfast</p> <p>21 room. A little bit probably in the front. And</p> <p>22 somehow in the master bedroom. I don't know how</p> <p>23 that happened, but it was a little bit right at the</p> <p>24 very edge of the master bedroom.</p> <p>25 Q. Okay. So, then, you had water in your --</p>

<p style="text-align: right;">Page 38</p> <p>1 all along the right side of your home, the laundry 2 room, the kitchen, the dining room. Did you have 3 water in the foyer? 4 A. Yes. 5 Q. And the living room? 6 A. Not so much the living room. 7 Q. Okay. 8 A. It barely got in there. I mean, it 9 wasn't completely covered with water. And the water 10 that was in there was maybe, gosh, half an inch. It 11 was almost like somebody took a big old bucket of 12 water and just poured it on the floor rather than 13 just -- it didn't stay very long. It receded pretty 14 quickly. 15 Q. How long did it take to recede? 16 A. Less than 24 hours. 17 Q. And you approximate there was probably a 18 half-inch of standing water? 19 A. Yeah, it was just something to more -- to 20 be more annoying than anything else. 21 Q. Okay. Was there a part of your home that 22 had higher standing water than another part? 23 A. Well, the part that was dry didn't have 24 any standing -- oh, standing water. No, I guess 25 they were probably about the same. I don't -- I</p>	<p style="text-align: right;">Page 40</p> <p>1 And we had to put -- we had to replace 2 the carpet that was in the master bedroom, because 3 even though a small portion of that had been damaged 4 by the water a little bit, it means the whole thing 5 has to go, so . . . 6 Q. Okay. Do you recall any details of that 7 rainstorm in 2009? 8 A. Just that I woke up and -- that morning 9 and I was, you know, stepping in water when I got 10 out of bed at 5:30 in the morning when it was 11 completely dark. And it was all hands on deck, you 12 know. 13 Q. All hands on deck. What does that mean? 14 A. It means what's going on here? You know, 15 let's -- what's happening? You know, you got to 16 take care of whatever -- you know, whatever's going 17 on. 18 Q. Okay. So did you -- do you recall how 19 much rain -- or how much water fell in 2009? 20 A. You'd have to go back and look at the 21 newspapers that measure those things. I don't have 22 a rain gauge. 23 Q. Okay. Do you recall if that rainstorm 24 was -- or -- was associated with any storm? 25 A. It -- if there was, it wasn't a named</p>
<p style="text-align: right;">Page 39</p> <p>1 didn't really notice at the time. 2 Q. Okay. It -- you didn't notice if the 3 water was a little bit higher in the dining room 4 than, say, in the kitchen? 5 A. Not really. 6 Q. Okay. But it was higher in the dining 7 room than it was in the living room and the master 8 bedroom? 9 A. Yes. 10 Q. Okay. Is it your belief that the water 11 crept in from the right side? 12 A. It is. 13 Q. What steps did you take to -- to repair 14 your home after water entered your home in 2009? 15 A. It really didn't need any repair. We -- 16 the only thing that we did was to replace the 17 baseboards. 18 Q. Okay. 19 A. That was it. 20 Q. Why did you replace the baseboards? 21 A. The other ones were -- we needed to do it 22 anyway, and the water had, you know, soaked the 23 baseboards. They were builder's grade baseboards, 24 1974, so we thought we'd put in better baseboards at 25 the time.</p>	<p style="text-align: right;">Page 41</p> <p>1 storm like you think of that are the tax day, 2 Memorial Day, or Harvey, or Allison, or anything 3 like that. It was just a cell that never -- it 4 stayed stationary over a period of time. 5 Q. Did any of your neighbors get water in 6 their house? 7 A. Yes, the neighbor to my north got a lot 8 of water in his house, because he's -- he's at the 9 lowest point of the street. 10 Q. So if you -- if I direct your attention 11 to Exhibit 1, can you identify which number -- or 12 which lot number that neighbor is? 13 A. I'm going to do my best to read this. 14 Q. Right. 15 A. It looks like it's number 25 there. 16 Q. Okay. So he's -- 17 A. Or 23. I'm not sure which one. 25, 18 because it looks like -- if I'm reading these in 19 order, yeah, it's 25. 20 Q. So he's right next to you and near the 21 cul-de-sac? 22 A. Correct. 23 Q. Okay. I see that. 24 And he's at the lowest part of the 25 street?</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 PHILLIP AZAR

9
 JULY 9, 2018
10 -----

11
12 ORAL DEPOSITION OF PHILLIP AZAR, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 9th day of July, 2018, from 9:02 a.m. to
16 5:03 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Kirby
18 Mansion, 2000 Smith Street, Suite 550, Houston, Texas
19 77002, pursuant to the Federal Rules of Civil Procedure
20 and the provisions stated on the record or attached
21 hereto; that the deposition shall be read and signed
22 before any notary public.

1 A. Yeah, I think I have that in the file.

2 Q. Do you know, were those documents related to
3 the home inspection provided to your attorneys for
4 discovery responses in this matter?

5 A. I don't remember, sir. But I believe I still
6 have all of that. You're asking for -- I don't know if
7 I had -- I don't know if I did an inspection; but if I
8 did, it would be in that file.

9 Q. Okay.

10 A. I would keep that probably.

11 Q. Okay. Do you think you have that file in
12 paper?

13 A. Oh, absolutely, yeah.

14 Q. Where have you kept that file?

15 A. We didn't have computers back then.

16 Q. Sorry. Let me ask again.

17 Is -- is that file in this building?

18 A. Yes, sir. If I still have it, it's in this
19 building.

20 Q. Do you think any documents related to the
21 purchase of the Magnolia Bend property are in this
22 building?

23 A. Unless they got destroyed in the other
24 building. We had a couple floods before this flood,
25 this last one last August. We had one in '15 and '16.

1 I think we had one in -- I'm going to say '92.

2 But in '92, maybe another one, I stopped
3 keeping my documents over there and brought them down
4 here, what I had left. So if they're not destroyed,
5 they are down here. They're within walking distance
6 right now.

7 Q. Okay.

8 A. And we didn't get flooded that bad down here,
9 so I should still have them.

10 Q. Okay. When did you purchase this property?
11 Can I refer to it as the Kirby house?

12 A. Kirby Mansion.

13 Q. Kirby Mansion. When did you purchase the Kirby
14 Mansion?

15 A. 1991 -- I'm sorry. '92, May of 1992.

16 Q. Why did you purchase the Kirby Mansion?

17 A. Looking for an office.

18 Q. Was the primary purpose of the purchase of the
19 Kirby Mansion for office space?

20 A. Correct.

21 Q. Did you intend to use the Kirby Mansion as a
22 residence, as well?

23 A. No.

24 Q. Besides office space, was there any other
25 purpose for purchasing the Kirby Mansion?

1 before. I don't know if it came here. It came in a
2 booklet. I remember a little brochure, but I know the
3 repetitive claims. And I can see the losses.

4 Q. Right. The losses listed on the third page?

5 A. Yes, sir.

6 Q. Yeah. So that was -- that was the one I wanted
7 to direct you to for the moment. And it says, "Multiple
8 Claims Report" at the top. And there's four claims, it
9 looks like, going back to 2001. And I wanted to -- to
10 pass that document to you just because I want to kind of
11 walk through some of the past flooding history. Because
12 I know, unfortunately, that you've been through this
13 before. And so I thought that would just be a helpful
14 reference as we walk through it.

15 So it looks like the first claim on this
16 report was in 2001. Do you recall having any flooding
17 at the home between 1990 and 2001?

18 A. 1990 and -- oh, from the time I got it?

19 Q. Yes, sir.

20 A. Until 2001? I believe so, at least one or two.

21 Q. Okay. Do you recall on what occasions you had
22 flooding during that time period?

23 A. I don't -- I mean, I recall the times. I
24 remember kidding around with Bobby Deden, "I thought you
25 said it would never flood." I remember that. He came

1 over to the place. I think if I bought it in '90, and I
2 believe I did, '89, '90, or '91. I don't remember
3 exactly. But if I bought it in '90, then we had another
4 pretty good-sized flood. I think it was '92, maybe '94.
5 I don't remember. But I know we had another flood
6 shortly, maybe within a few years after -- of buying the
7 property.

8 Q. And do you recall, did the floodwaters reach
9 your home?

10 A. Yes, sir, inside.

11 Q. Okay. Where inside the home did the
12 floodwaters reach in that -- we'll call it early '90s
13 event?

14 A. I don't believe it was '90 but, say, '92.

15 Q. '90 -- we'll call it --

16 A. Early '90s. You got it. Yes, sir.

17 The water definitely got inside the first
18 floor. There's three floors to this house. I
19 apologize. Three floors. And it definitely got into
20 the first floor, no doubt about it, garage/first floor.

21 Q. Do you recall about how deep the water was in
22 the home during that '92 event?

23 A. Inches. Inches.

24 Q. Do you recall filing an insurance claim for
25 that event?

1 tile in the cold wine room. And then in the
2 recreational room it's another tile. Is that what
3 you're -- just tile, brown tile. And it's all tile back
4 there.

5 Q. Okay.

6 A. And then there's cedar out on the deck.

7 Q. When you had that first flood in the '92 time
8 frame, do you recall replacing the flooring material in
9 the home?

10 A. Some of it, yes. Not much. It was more
11 cleanup on -- on most of the floods, it was more
12 cleanup. Now, '15 -- may I go further because '15 and
13 '16, it was different.

14 Q. Why don't we try to take them in order.

15 A. Sure. Okay.

16 Q. So it sounds like in that -- first, in that '92
17 flood, it was mostly cleanup but you did replace some
18 flooring.

19 A. I don't remember. If you put it in front of
20 me, I'll tell you exactly what it is. But I just don't
21 remember everything. They weren't as bad as the '15 and
22 '16.

23 Q. Okay. Well, looking at the document that I
24 handed you, the furthest date of loss going back in time
25 on that page 3 is June 9th of 2001.

1 What can you tell me about the June 9,
2 2001, flooding event?

3 A. I don't even know what happened then. I just
4 don't -- I'm not trying to escape my answer. I just
5 don't remember. I've been through a lot since then, but
6 I just don't remember. If it happened on that day, I
7 believe it.

8 Q. Okay. There's a -- an event that was in --
9 well, actually, here, let me go back for a moment.

10 Do you recall a storm called Allison?

11 A. Yes.

12 Q. Okay. Allison happened in June of 2001. Does
13 that --

14 A. You asked me a question earlier about floods,
15 have I ever tried one. I did try one. And it was for
16 Allison. It was right down here, and I apologize. It
17 was right down here for Dominique Hermez, was my client
18 and was down here at the -- what is the hospital --
19 St. Joseph right down here. It tore out his restaurant,
20 the flood did or Allison did. I remember that now. And
21 that did end up in a jury trial.

22 If you need more information about that, I
23 can get it for you.

24 Q. All right. So let me go back. Do you recall
25 the Allison storm in June of 2001?

1 A. I was here.

2 Q. Okay. When you say you were here, you mean you
3 were in Houston during that storm?

4 A. I was at the Kirby Mansion here in Houston,
5 Texas. Yes, sir.

6 Q. Okay. Were you at the Magnolia Bend property
7 during that storm?

8 A. Yes, sir.

9 Q. And did you -- did the Magnolia Bend property
10 experience flooding during Allison?

11 A. I believe it did.

12 Q. Okay. What do you recall about the flooding at
13 the Magnolia Bend property during Allison?

14 A. If that's the one I'm thinking about, that's
15 the one where all the 18-wheelers were floating down
16 I-10 and all that. I remember the water came up to the
17 curb here. And I think that's the one that messed up
18 the -- the courts downtown here. And I really don't
19 remember, you know, what it was like at the -- I mean, I
20 know it happened. But I just don't remember all of the
21 damages at 3 Magnolia Bend.

22 But I can probably pull all that up. I'm
23 sure I've kept it. It was -- I mean, these were all
24 pretty devastating to the family because we -- again, we
25 had to take -- if you don't mind me narrating.

1 THE WITNESS: Is that all right?

2 MR. ROBERTS: Just be answering his
3 questions.

4 A. Okay. Well, it's just nothing like the
5 release. You know what I mean? It was horrible, your
6 release, this last one. But these, you know, they came
7 up a few inches but nothing like this last one. Because
8 I remember before, when things would happen, we would
9 stick things on the pool table, you know, expensive
10 things, like stereos, TVs that were downstairs. We put
11 them on the -- we think we're going to get by, by
12 putting them on the elevator -- not on the elevator, on
13 the -- on the pool table. Not this time. Does that
14 make any sense?

15 Q. (BY MR. LEVINE) That's helpful. I'm trying to
16 walk through each storm sequentially.

17 A. Sorry.

18 Q. No. It's okay. Let me -- let me say this --

19 A. Go back to your question again.

20 Q. Sure. Well, when -- when the United States
21 sent its document request, were you aware that we asked
22 for information relating to previous flooding events at
23 the subject property?

24 A. I believe if I didn't give them, I'm still
25 working on them. I've had a couple of deaths in the

1 2009. Do you recall that flooding event?

2 A. No. But if -- if FEMA says it happened on that
3 day, I believe them. I mean, I believe you-all. It
4 probably happened. I just don't remember all that
5 happened in 2009.

6 Q. Okay.

7 A. I'm not trying to escape my answer. I just
8 don't remember.

9 Q. No. It's understandable. You've been through
10 several of these events. I can understand how it would
11 be hard to keep track of the details.

12 A. But I can -- I can get --

13 MR. ROBERTS: Objection to sidebar.

14 THE WITNESS: I'm sorry?

15 MR. ROBERTS: I was just getting my
16 objection on the record.

17 A. I can get those files for you and tell you, you
18 know, pretty much the same thing. I mean, it's the same
19 house, you know. And it's basically the same floodwater
20 and the same cleanup. If that's the same thing that
21 happened. Some -- some are worse than others. That's
22 all I can tell you. Some come right up to the house but
23 don't go in, which is good.

24 Q. (BY MR. LEVINE) Do you recall a storm called

25 Ike?

1 A. Sure do. 2008?

2 Q. Yes.

3 A. Yes, sir.

4 Q. Ike happened in September of 2008.

5 Do you recall flooding at the Magnolia Bend
6 property during Ike?

7 A. I do. I believe so, yes, sir.

8 Q. What do you recall about the flooding during
9 Ike at the Magnolia Bend property?

10 A. I believe it was, you know, higher than the
11 other ones, but not as high as this last one.

12 Q. Do you --

13 A. Again, I'm not trying to be evasive. I just
14 don't have it in front of me. If you put something in
15 front of me, I could go crazy on it; but I just don't
16 remember everything. I'm pretty sure we had a flood
17 back then because I remember putting that on my IRS
18 1040.

19 Q. A moment ago, you used the phrase "same house,"
20 "same floodwaters," "same cleanup." When you said "same
21 floodwater," what -- what did you mean by that?

22 A. Same floodwater, what do you mean? Well, you
23 know, it comes out of the Buffalo Bayou. You know,
24 it's -- water goes in my house. I mean, it's
25 floodwaters going in the house. I mean, the house

1 hasn't moved. It got cleaned since the last flood.
2 Then it flooded again. It's happened a couple of times,
3 several times. You know that.

4 Q. So let's talk a little bit about the storms in
5 2015 and 2016. And then we'll -- we'll get to Harvey
6 and the most recent event shortly.

7 A. Sure.

8 Q. What can you tell me about the storm that took
9 place in May of 2015, sometimes referred to as the
10 Memorial Day Storm?

11 A. I'll have to say the same thing. I don't -- I
12 mean, if you tell me I had a flood, I believe you and
13 I'll say it happened. But again, water got in and there
14 was cleanup. And I'm sure there was furniture that was
15 lost and clothes that were lost and toys that were lost.
16 And it seems like we always have damage to the bar area
17 and that Jacuzzi area because we don't keep water
18 because of the grandkids. We're afraid they might get
19 in there. If water comes in there, it's like a bubble.
20 The water just pushes it up and breaks everything around
21 it, the tile and stuff.

22 If it happened during that time period, it
23 happened, I mean. And the paint, of course. And if it
24 got high enough for the -- what do you call it -- the
25 electrical outlets, we probably replaced those.

1 I remember one year, and I think it was
2 that year. I just can't remember the -- the type of
3 air-conditioning system. But it's an air-conditioning
4 system that uses the water down below. And it sucked in
5 that water into the whole system. And I think that was
6 2008. I think that was the one.

7 If it wasn't, it was another one. But
8 sometimes, you know -- now we're getting a little
9 smarter. We turned the air conditioner off. So if
10 it -- if the pipes are busted, it doesn't keep on
11 sucking up the floodwater, which is sometimes pretty
12 dirty. And that happened. I remember that.

13 It went through all of our air conditioners
14 and tore them up, just rusted them out and put some kind
15 of strange stuff in them.

16 Q. Okay. So during one of the pre-Harvey storms,
17 there was an instance where water got into your -- is it
18 a geothermal air-conditioning system?

19 A. Very good. Thank you.

20 Q. All right. So at one point, in a pre-Harvey
21 storm, floodwaters got into your geothermal
22 air-conditioning system and ruined the air-conditioning
23 throughout the house?

24 A. That's correct, sir.

25 Q. Okay. Do you recall which pre-Harvey storm

1 Q. Given that you've flooded so many times, would
2 you say it's hard to keep track of the details of each
3 event?

4 A. Absolutely. Without having it in front of me,
5 I just don't remember everything.

6 Q. Do you recall where you were during the
7 Memorial Day Floods in May of 2015?

8 A. If I wasn't down here, I was over there. And
9 if I wasn't over there, I was on my way there. I was
10 here in town.

11 Q. Do you recall any observations from that
12 May 2015 storm?

13 A. I don't remember the storm, to be honest with
14 you. Again, I'm not trying to evade any answer. I just
15 don't remember. Is there something you're looking for?
16 Just ask me, I'll tell you the truth.

17 Just to tell me, what do you remember about
18 the storm, I remember there's water and everyone is
19 going crazy, taking stuff from the first floor to the
20 second floor. Other than that, I'm sure that happened.

21 Q. Do you recall how deep the floodwaters were in
22 the Magnolia Bend home during the May 2015 storm?

23 A. Inches. Compared to this one, inches. When I
24 say this one, I mean the last one last year.

25 Q. Do you think the total depth of floodwaters in

1 your home from the May 2015 storm was more than a foot?

2 A. May 25th?

3 Q. May 2015 storm.

4 A. I'd have to look at the paperwork. I don't
5 remember. I mean, I did these claims myself or the
6 people here helped me with them. But, I mean, if I
7 could get the documents, I'll tell you exactly what it
8 was.

9 Q. Prior to Hurricane Harvey --

10 A. Yes, sir.

11 Q. -- what's the deepest the floodwaters have ever
12 been during a flooding event at the Magnolia Bend home?

13 A. I think one or two got around the -- what do
14 you call it -- the outlets. But nothing -- and that's
15 just on the first floor. In other words, on the first
16 floor, it came up from the banks, which is 3 or 4 feet
17 down, maybe 2 or 3 feet. And then it got into the first
18 floor. Usually starts with the garage. And then if it
19 got up to the outlets, that's another probably foot.

20 Q. So prior to Harvey, you don't recall
21 floodwaters in your home above the outlets on the first
22 floor?

23 A. There may have been. If there was, we always
24 replaced the outlets. A couple of the floods, if I may,
25 came late at night. I think we tried to take some

1 pictures, but a lot of them didn't come out. So
2 sometimes, we don't know how high they got. We really
3 don't know how high Harvey got. We did find a line in
4 there, remember? We found a line in there where the
5 water settled down. But we don't know how long it
6 settled there. And we do have some pictures of Harvey,
7 and we probably have pictures of the other floods too,
8 I'm sure.

9 Q. Prior to Harvey, what was the longest duration
10 of flooding during any of the flooding events we've
11 discussed in that Magnolia Bend home?

12 A. In and out --

13 MR. ROBERTS: Objection; form.

14 THE WITNESS: I'm sorry?

15 MR. ROBERTS: I'm just objecting.

16 A. I mean, out so fast, it's not even funny.
17 There was one time it almost swept Big Mark away, and
18 he's bigger than all of us put together. He's a big old
19 boy, my brother. It almost swept him out. I mean, the
20 water went out so quick. It's like they did something.
21 I don't know what they did. And one time, it didn't go
22 out that quick, but it was out within about an hour.

23 In other words, usually when the flood
24 subsides, it's gone. It just leaves. It goes
25 somewhere. But this time, if I may add, it was there

1 for at least a couple of weeks.

2 Q. (BY MR. LEVINE) During any flooding event at
3 the Magnolia Bend property prior to Harvey, was water in
4 the home for more than an hour?

5 A. I don't believe so. I mean, I just -- I don't
6 know. I know when it went out, it was gone. I'd call
7 over there or I'd be up on the second floor. We'd go
8 down, it's out. If I may -- if I could look at the
9 paperwork that might help, but I don't remember the
10 water being in there that long.

11 Q. Okay.

12 A. Usually when it flooded, the abatement people
13 were there the next day, or I'd call somebody and
14 they'll get over there. But this time, we went over
15 there three or four times, and we're thinking that the
16 water is going down and it didn't go down. We got
17 there, and it went back up on a sunny day.

18 Q. During any of the flooding events prior to
19 Hurricane Harvey, was there ever any wind damage to the
20 home?

21 A. Always.

22 Q. Can you describe what type of wind damage
23 you've had to the home in previous flood events,
24 previous before Harvey?

25 A. I don't remember which one, but I remember

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF

9 PETER SILVERMAN

10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF PETER SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 9:06 a.m. to
16 3:52 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.
23
24
25

1 A. And the company that was sort of managing the
2 rental on the house hired them.

3 Q. Okay. And why did you install this drainage
4 system?

5 A. Because there was insufficient drainage at the
6 house when it -- when there was a heavy rain.

7 Q. Do you recall when that heavy rain was?

8 A. It was sometime in '93. And so we said let's
9 go ahead and figure out what the problem is and try to
10 fix it.

11 Q. Do you recall how much rain there was in 1993?

12 A. No. We were living overseas at the time, so we
13 were not in the country at the time of the event.

14 Q. Okay. Did you have tenants there?

15 A. Yes.

16 Q. Did they notify you how much rain there was?

17 A. No.

18 Q. Did your home experience flooding at that time?

19 A. Because of the drainage, the water came in
20 through the weep holes and there was carpeting that got
21 wet.

22 Q. Do you know how much water came into your home?

23 A. Only in enough to wet the edges of the
24 carpeting in the house. There was not water throughout
25 the home.

1 A. I know of one house that was built in the
2 subdivision since we lived there. A couple of blocks
3 away there was either one house out on a double lot or
4 there was a free lot. And so there was one lot that has
5 been built since we lived -- since we lived there.

6 Q. (BY MS. IZFAR) Okay.

7 A. But not on Westerley and not on any road
8 abutting Westerley. But I know of one newer house that
9 was probably built in the '90s.

10 Q. Okay. So you mentioned that your home flooded
11 in 1993 to 1994. Was that the first time your home
12 flooded while you were -- after you had purchased it in
13 1990?

14 MR. HODGE: Objection; form. That
15 misstates his testimony.

16 A. You know, my issue is we didn't consider it
17 flooded. But we made a claim and that claim went to
18 flood insurance. We -- we sort of viewed it as a
19 drainage issue and not a flood event.

20 Q. (BY MS. IZFAR) Okay. I'll clarify.

21 So you mentioned in 1993 that water entered
22 your property after or during a rainstorm. Was that the
23 first time that rainwater or storm water had entered
24 your property after you purchased it in 1990?

25 MS. TARDIFF: Entered your home.

1 '91 and he came back. And I think he was four years old
2 when he came back. So I think we came back probably '95
3 or -- around after being gone maybe four years or
4 four-plus years so. I think it was maybe '95 or the
5 beginning of '96.

6 Q. Okay. And during that time when you were
7 abroad, who was living in the home?

8 A. For -- for a large period, no one was. We were
9 lucky that my job provided us housing overseas. We
10 lived sort of like Gypsies because we lived so many
11 places that we sort of went from a service apartment to
12 a service apartment. So we weren't -- we didn't have
13 really the concern of having someone in the house at all
14 times.

15 Q. Okay. And during that time when you were away,
16 there were at least two rain events where water entered
17 your home, right?

18 A. There were -- there were those events in those
19 years when -- when we had those claims, yes.

20 Q. So the 1992 flood insurance covered your
21 claim -- or you received coverage, right?

22 A. We received a payment from our flood insurance
23 in '92, yes.

24 Q. Okay. And then the 1993 to 1994 event, did you
25 also receive coverage?

1 A. Yes. There was a claim made, and I think the
2 carpeting was replaced again. And then the tenants
3 moved back in -- or the tenants were there during the
4 time. They didn't move out at all. I don't really
5 recall which one.

6 Q. So the carpeting was replaced in 1993, 1994.
7 Was any other remediation work done?

8 A. I don't recall. Like I said, we had this
9 company managing the house, and that's when they looked
10 into the drainage system and all of those things. So
11 they covered all of those expenses. I mean, we paid it,
12 but they managed it all.

13 Q. Yeah. Did they approach you about installing
14 this drainage system in 1993 and 1994?

15 A. To the extent that they managed the process and
16 found the engineer and hired someone and hired the
17 plumbers and everything like that.

18 Q. Did you instruct them to investigate the
19 drainage?

20 A. I don't -- I don't recall how the conversation
21 started except that -- that we knew we had two
22 incidents, and we needed to figure out what the problem
23 was and fix it.

24 Q. So did -- did you -- did you have any reason to
25 believe that the drainage was the issue?

1 A. Yes.

2 Q. And why was that?

3 A. Because, as soon as the water drained, there
4 was no issues.

5 Q. So prior to 1993, 1994 when you installed this
6 new drainage system, did you have standing water in your
7 patio?

8 A. No.

9 Q. Did you have standing water in your backyard at
10 all?

11 A. No.

12 Q. Did you have any indication -- or did you --
13 was there any indication to make you believe that water
14 was not draining from your property?

15 A. No. It wasn't an issue of water draining, yes
16 or no. It was more of water -- more issue of keeping up
17 with the rainfall when falling, so...

18 Q. Okay.

19 A. So it was more scope rather than a yes or no.

20 Q. Understood. So you mentioned two incidents,
21 one in 1992 and one in 1993 to 1994. Were there any
22 other incidents when rainwater or any water entered your
23 home?

24 A. There -- there were a couple of other claims
25 made over the 25 years. But I don't -- you'd have to

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF

9 ZHENNIA SILVERMAN

10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF ZHENNIA SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 4:05 p.m. to
16 5:34 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.
23
24
25

1 Q. Okay. And when you were driving home, you said
2 that you were on I-10 for six or seven hours?

3 A. Uh-huh.

4 Q. With an infant, wow.

5 A. Yes.

6 Q. Do you recall seeing water anywhere, you know,
7 on the streets while you were driving?

8 A. No, I don't remember rising water or anything
9 like that. I just remember rain -- a lot of rain, and
10 just the traffic was not moving. People were basically
11 just stopped. And of course I didn't know what was, you
12 know, 4 or 5 miles ahead of me at the time.

13 Q. Do you recall if this particular rain event had
14 a name at all?

15 A. I don't.

16 Q. It wasn't Andrew, was it?

17 A. I couldn't tell you.

18 Q. Okay. So when you got home it must have been
19 pretty late at that time, right?

20 A. Yes.

21 Q. And do you recall seeing any standing water in
22 your house?

23 A. No, I do not. As my husband had previously
24 mentioned, our house was -- our house was for sale at
25 the time. And when I left for work that morning, I had

1 the beginnings of a baby scrapbook and so I needed a
2 place to put it. So I put it under the bed. And when I
3 got home -- it was just like a -- you know, like a
4 Macy's -- the lid of a Macy's box. And when I got home
5 the bottom of the box was wet, but not the contents.

6 Q. And the scrapbook was located in your bedroom?

7 A. In my -- yeah, right. Correct. In our
8 bedroom.

9 Q. I want to show you what we marked as Exhibit 3
10 in your husband's deposition. Can you point to the room
11 where the scrapbook was located?

12 A. It would have been -- let's see. So this is --
13 okay. Right. Right. Right. I mean, actually it would
14 have been right over here. Because this is our patio,
15 laundry room, bathroom, and then this primary room is
16 really off to the side over here.

17 Q. Okay. Could you do me a favor and circle where
18 the scrapbook was?

19 MR. HODGE: So Exhibit 3 was part of
20 Mr. Silverman's deposition, and it was maintained as
21 such. I want to make sure we're being clear on the
22 record if we're modifying an exhibit to Mr. Silverman's
23 deposition now in Mrs. Silverman's deposition.

24 MS. IZFAR: Okay. My intention is to keep
25 the same numbers and to refer to them as Silverman and

1 1992.

2 Q. (BY MS. IZFAR) Do you recall any other areas
3 in which there was flooding?

4 A. No. Because by the time I got home there
5 was -- I mean, there was nothing. I mean, it was --
6 maybe it was just a little damp, but that was it.

7 Q. Okay. Was there any other standing water on
8 your property outside of your home?

9 A. No.

10 Q. Okay. And do you -- did you stay in your home
11 that night?

12 A. Yes.

13 Q. Did you ever move out?

14 A. No, I didn't. It was really late at night and,
15 I mean, I had been in my car, you know, for most -- for
16 a really long time. So, no, I stayed -- I stayed at
17 home.

18 Q. Okay. And were you involved with the
19 remediation?

20 A. You know, I remember calling my husband who was
21 in Thailand and telling him what had happened. And I
22 really didn't know what to do. And I remember he told
23 me, I think, maybe, you know, call an adjuster,
24 whatever. But I really don't recall, to tell you the
25 truth. I couldn't tell you what was remediated. I

1 remember -- yeah, I'm pretty sure my husband was not
2 home for that one.

3 Q. Okay. Were you -- do you recall being home?

4 A. Again, I would have been at work. But when I
5 got home, yes, I would have -- you know, I would have
6 known.

7 Q. Okay. Do you recall where the water entered
8 your house?

9 A. No. But I guess it would have been in our
10 bedroom, but I don't really recall. Because by the time
11 I got home there wasn't any water. There may have been
12 some wet carpeting. But I don't remember each event
13 specifically. 2009 I came home afterwards as well. And
14 I do know at that time my husband had gotten
15 dehumidifiers and fans, like professional ones. But I
16 don't think we replaced the carpet, we just steam
17 cleaned it.

18 Q. Okay. Do you -- do you recall how much water
19 was in your house in 2009?

20 A. No. I mean, it was never -- it was never -- I
21 mean, it was just enough to -- to wet the carpet or, you
22 know, make the tile floors a little damp maybe in our
23 bedroom. But it wasn't like -- it wasn't like inches or
24 not even an inch. I mean, and it wasn't -- by the time
25 I got home, it wasn't there.

1 Q. Okay. Do you ever stock up for hurricanes?

2 A. No, I don't think we ever have. Maybe, you
3 know, water. But, no, I don't think we've ever -- we've
4 never really prepared like gone out and bought -- not
5 like, you know, what you see on the news, people in
6 Florida emptying the shelves and buying batteries, no.

7 Q. Have you ever evacuated before a storm before?

8 A. No.

9 Q. So do you recall after -- about a month after
10 Hurricane Katrina there was another storm, Hurricane
11 Rita, where a lot of Houstonians voluntarily evacuated.
12 You didn't evacuate then?

13 A. No.

14 Q. Do you recall how much rain there was during
15 that event?

16 A. I don't. I was working and I worked until
17 about 2:00 o'clock in the morning on the day that
18 everybody was supposed to evacuate. And by the time I
19 got home it was too late for us to leave. And it turned
20 out to be a very good thing because it was needless at
21 the end and, you know, people were stuck on highways
22 forever.

23 Q. You work really long hours.

24 A. Yes.

25 Q. Do you -- do you ever recall a rain event like

1 Harvey?

2 A. I don't. And I have no idea what the rain --
3 you know, what that incident was like, because I wasn't
4 here. And so I have no idea what the water was like.
5 And I know that it rained really hard on July 4th, but I
6 was in New York working. And so, again, I mean, I've
7 just missed out on -- on being able -- I mean, I can't
8 gauge.

9 Q. Right. Do you ever recall a rain event where
10 there were consecutive days of rain?

11 A. Yes. And I don't know if it was 2015 or 2016,
12 but it rained for a really long time. And, you know,
13 the water in the bayou rose, but, I mean, we didn't have
14 any problems; nothing happened to our home. And I
15 remember they actually told us to stay home, which is
16 really a miracle. And so my husband and I, we just
17 drove around and, you know, just kind of drove around
18 and looked at -- you know, looked at the water and
19 stuff. But there was nothing near our home.

20 Q. Do you have any -- any estimate as to how deep
21 the channel is for Buffalo Bayou right outside your
22 neighbor's home?

23 A. No. And I will tell you that in the 28 years
24 that we've lived there, I have never so much as crossed
25 the street and gotten as far as my husband did to look

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE: DOWNSTREAM §

ADDICKS AND BARKER (TEXAS) §

FLOOD-CONTROL RESERVOIRS §

vs. § SUB-MASTER DOCKET NO.

§ 17-cv-9002L

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

§

ORAL DEPOSITION

MR. SHAWN S. WELLING

August 14, 2018

ORAL DEPOSITION OF MR. SHAWN S. WELLING,

produced as a witness at the instance of the United States and duly sworn, was taken in the above-styled and numbered cause on the 14th day of August, 2018, from 9:22 a.m. to 3:52 p.m., before Michelle Hartman, Certified Shorthand Reporter in and for the State of Texas and Registered Professional Reporter, reported by computerized stenotype machine at the offices of Potts Law Firm, 3737 Buffalo Speedway, Suite 1900, Houston, Texas 77098, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto.

<p style="text-align: right;">Page 54</p> <p>1 talked about that.</p> <p>2 Nothing except maintenance.</p> <p>3 Q. Prior to Harvey, had there been any</p> <p>4 occasion where there was ever water in the first</p> <p>5 floor of your property, the test property?</p> <p>6 A. Rising water? No, never.</p> <p>7 Q. Water from any source?</p> <p>8 A. Yes.</p> <p>9 Q. Okay. Tell me about that history. Did</p> <p>10 that occur more than once?</p> <p>11 A. Uh-huh.</p> <p>12 Q. Okay. What is the first one you can</p> <p>13 recall?</p> <p>14 A. Let's see, Ike.</p> <p>15 Q. And prior to Ike, do you ever recall</p> <p>16 any water in the downstairs?</p> <p>17 A. Any time to get only -- only on the</p> <p>18 right side of the building, not the left, not</p> <p>19 anywhere near the AC units or any of the living</p> <p>20 structure. When I say "living structure," I'm</p> <p>21 talking about the original living structure.</p> <p>22 But the new addition on what is now</p> <p>23 considered first floor as well, water will seep</p> <p>24 through and get the floor damp with maybe I would</p> <p>25 say, oh, a quarter of an inch in some areas, some</p>	<p style="text-align: right;">Page 56</p> <p>1 A. That was the first time rising water</p> <p>2 has ever gotten near our building.</p> <p>3 Q. And prior to Harvey?</p> <p>4 A. It -- like I said, I really can't say</p> <p>5 it's been more than a half an inch, a quarter of an</p> <p>6 inch in some areas. There are so many different</p> <p>7 variances, I really don't have a specific time I can</p> <p>8 remember, but it is honest to say it happens</p> <p>9 relatively often --</p> <p>10 Q. Okay.</p> <p>11 A. -- in that one area. Not in any of the</p> <p>12 other first floors, just in that one underneath the</p> <p>13 dance studio area.</p> <p>14 Q. And so then underneath this dance</p> <p>15 studio area, would that have been part of the first</p> <p>16 floor?</p> <p>17 A. No.</p> <p>18 Q. Okay. And --</p> <p>19 (Exhibit 6 marked)</p> <p>20 MR. DAIN: Which number is this?</p> <p>21 THE COURT REPORTER: 6.</p> <p>22 Q. (BY MR. DAIN) Handing you what's been</p> <p>23 marked Welling Exhibit 6.</p> <p>24 I have 1 through 5 here, which are</p> <p>25 some of the discovery responses. I probably should</p>
<p style="text-align: right;">Page 55</p> <p>1 areas.</p> <p>2 Q. And that was true from 2000 forward?</p> <p>3 A. Yeah.</p> <p>4 Q. Like what type of -- I didn't mean to</p> <p>5 interrupt you.</p> <p>6 A. I recall maybe six times it has</p> <p>7 occurred, six, seven times.</p> <p>8 Q. Okay. And what happened in Ike?</p> <p>9 A. Well, not much of anything more than</p> <p>10 any other hard -- really hard rain because it is a</p> <p>11 result of running water coming down and getting</p> <p>12 through the -- the walls. And it's, like I said,</p> <p>13 minimal. So we would just suck it out with -- what</p> <p>14 do you call those things? -- E-vac.</p> <p>15 Q. And that occurred in Ike as a result of</p> <p>16 the Ike rains?</p> <p>17 A. A lot of different times. A lot of</p> <p>18 different times if it's really, really heavy rain.</p> <p>19 But again, not that it is obvious. We can access it</p> <p>20 because we're not excluded to getting to the</p> <p>21 building, and it is minimal to nothing.</p> <p>22 Q. And what is the most accumulation you</p> <p>23 recall down there?</p> <p>24 A. Harvey.</p> <p>25 Q. Prior?</p>	<p style="text-align: right;">Page 57</p> <p>1 have gone ahead and marked (sic) all those, but we're</p> <p>2 going to talk about this one right now.</p> <p>3 These are some floor plans generated</p> <p>4 by an entity that the United States hired to help us</p> <p>5 understand these properties as part of this</p> <p>6 litigation.</p> <p>7 A. So I do have a blueprint of the new</p> <p>8 space. This is great. I like seeing everything all</p> <p>9 official.</p> <p>10 MR. SALISBURY: And to be clear, this</p> <p>11 is something y'all put together, right?</p> <p>12 MR. DAIN: This is something that we,</p> <p>13 that the United States, has created.</p> <p>14 MR. SALISBURY: Right.</p> <p>15 THE WITNESS: Okay. Okay.</p> <p>16 Q. (BY MR. DAIN) So the last page of this</p> <p>17 in the lower left-hand corner states "Welling, lower</p> <p>18 studio."</p> <p>19 A. Uh-huh.</p> <p>20 Q. Can you identify what that is?</p> <p>21 A. It was usually set out to be Studio B.</p> <p>22 It still is being used for that purpose, in two</p> <p>23 different functions for us. One if a private lessons</p> <p>24 need to occur during a time of --</p> <p>25 (Phone vibrates.)</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS
3 AND BARKER (TEXAS)
4 FLOOD-CONTROL RESERVOIRS Sub-Master Docket No.
17-cv-9001L

5
6 Judge Charles F. Lettow

7 THIS DOCUMENT RELATES TO:
8 ALL UPSTREAM CASES
9

10 ORAL DEPOSITION OF VAL ALDRED
11 AUGUST 1, 2018
12
13

14 ORAL DEPOSITION OF VAL ALDRED, produced as a
15 witness at the instance of the Defendant and duly
16 sworn, was taken in the above styled and numbered
17 cause on Wednesday, August 1, 2018, from 8:58 a.m.
18 to 3:31 p.m., before Rene White Moarefi, CSR, CRR,
19 RPR in and for the State of Texas, reported by
20 computerized stenotype machine, at the offices of
21 Potts Law Firm, 3737 Buffalo Speedway, Suite 1900,
22 Houston, Texas, pursuant to the Federal Rules of
23 Civil Procedure and any provisions stated on the
24 record herein.
25

<p style="text-align: right;">Page 62</p> <p>1 Q. So you spent two nights away from your 2 home, then?</p> <p>3 A. That's -- well, before I came back on the 4 31st, yes.</p> <p>5 Q. Okay. And how long did you stay at your 6 home on the 31st?</p> <p>7 A. Well, we -- we went in, saw that the 8 water was still standing in the -- in the house, 9 took pictures, tried to put some furniture on -- in 10 cups and things like that so it wouldn't be standing 11 in water and -- not much we could do.</p> <p>12 Q. How much water did you see?</p> <p>13 A. At the time, probably about a foot. And 14 that's because it had receded, more than likely.</p> <p>15 Q. How much water do you estimate that you 16 received in total?</p> <p>17 A. About a foot and a half.</p> <p>18 Q. Okay. And what's that estimate based on?</p> <p>19 A. Based on the water lines that were on the 20 studs.</p> <p>21 Q. And was that water level uniform 22 throughout the house?</p> <p>23 A. I think so.</p> <p>24 Q. Did -- did you notice that one portion of 25 your home received more water than another portion?</p>	<p style="text-align: right;">Page 64</p> <p>1 furniture into paper cups. Did you take any other 2 steps at that time to try to save any of your 3 belongings?</p> <p>4 A. No. I mean, that was about all we could 5 do at the time. Everything -- everything we had 6 done before we evacuated was done, and it was all we 7 could do at the time.</p> <p>8 Q. Okay. Do you recall when you left your 9 home on the 31st?</p> <p>10 A. A couple hours later.</p> <p>11 Q. Okay. And during that time, had the 12 water level changed at all?</p> <p>13 A. I -- I don't know.</p> <p>14 Q. Okay. Do you recall when you next 15 returned to your home?</p> <p>16 A. It was a Saturday, the -- September 17 the 2nd.</p> <p>18 Q. Okay. And when you returned to your 19 home, what did you see?</p> <p>20 A. It -- it wasn't as much water. It -- to 21 that point, we could begin and did muck out all the 22 walls, tear down the walls, take out the sheetrock, 23 squeegee out whatever water we could that was near 24 the door.</p> <p>25 Q. So do you have an estimate as to how much</p>
<p style="text-align: right;">Page 63</p> <p>1 A. No, I don't recall.</p> <p>2 Q. Okay. You mentioned earlier, I believe, 3 that the home sloped downward the further north you 4 went. Did the north side of your home, which is, I 5 believe, the right side of your home, get more 6 water?</p> <p>7 A. You know, there was a lot of water that 8 day. I just don't remember. I mean, I didn't take 9 the time to measure it.</p> <p>10 Q. So when you came to your home on the 31st 11 around midmorning, can you just walk me through what 12 you saw?</p> <p>13 A. Yeah. I saw our street was still 14 flooded. We had to park on the street on 15 Thornbranch, which is the street east of ours. And 16 we parked as far as we could -- you know, as close 17 as we could and then walked around the -- the corner 18 and then crossed our street to the house.</p> <p>19 Oh, and then from there, we went inside 20 and saw all the water that was standing there and 21 just, you know, were, I guess, unhappy about it. We 22 were sad. It was -- took some pictures and, you 23 know, tried to -- tried to organize or get our -- 24 collect our thoughts as best we could.</p> <p>25 Q. Okay. You mentioned that you put some</p>	<p style="text-align: right;">Page 65</p> <p>1 standing water there was at that time on the 2nd?</p> <p>2 A. No, I don't.</p> <p>3 Q. Okay.</p> <p>4 A. I don't. I just -- no.</p> <p>5 Q. Okay. Were you able to squeegee out the 6 water?</p> <p>7 A. I know that I didn't. My wife may have 8 had a broom and tried to push some of it out.</p> <p>9 Q. Okay. Did your wife accompany you on 10 both trips?</p> <p>11 A. Yes.</p> <p>12 Q. Did anyone else accompany you?</p> <p>13 A. Let's see. My daughter who -- Casey came 14 with me on the first trip. I don't remember if she 15 was with me on the second trip. And then the 16 daughter I was living with accompanied me on the 17 second trip. I just -- there were people coming and 18 going, honestly.</p> <p>19 Q. Right.</p> <p>20 A. I don't remember who was who or when and 21 where.</p> <p>22 Q. Did you personally rip out the sheetrock 23 and the insulation?</p> <p>24 A. I did a little bit, yes.</p> <p>25 Q. And your family did as well?</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 PHILLIP AZAR

9
 JULY 9, 2018
10 -----

11
12 ORAL DEPOSITION OF PHILLIP AZAR, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 9th day of July, 2018, from 9:02 a.m. to
16 5:03 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Kirby
18 Mansion, 2000 Smith Street, Suite 550, Houston, Texas
19 77002, pursuant to the Federal Rules of Civil Procedure
20 and the provisions stated on the record or attached
21 hereto; that the deposition shall be read and signed
22 before any notary public.

1 A. I don't know if that was the high watermark.
2 I've never seen it. I've just heard about it. I've
3 seen the one in the elevator. And me and Ms. Stout, the
4 one that did this for Jackson insurance company, I was
5 debating that with her. I remember that's why me and
6 her got -- I got sideways with her because, as far as
7 I'm concerned, I don't know where that water went. And
8 she kept asking me. And I said I have no idea. I know
9 that we stepped off -- my family stepped off the second
10 floor, you know, outside and left in a boat.

11 So if it went higher, it may have gone
12 higher. But I know there -- it settled down somewhere,
13 and I guess it settled down there. And that was
14 somewhere below, according to her mark, I think, right
15 below the second-floor floor. That make sense?

16 Q. Yes. Are you -- are you saying that the
17 waterline that is reflected in this report at 117 inches
18 is below the subfloor of the second floor?

19 A. No. I'm saying that's what they're saying. I
20 didn't see anything. I don't -- I'm not trying to be
21 evasive with you or play games with you. I don't know.
22 I thought it was higher than that according to my
23 family.

24 Q. So sorry. Let me rephrase the question.

25 Does the report suggest that the waterline

1 was at 117 inches --

2 A. Yes, sir.

3 Q. -- and below the subfloor of the second floor?

4 A. Yeah. It's right at the -- that's correct.

5 And if I may add, it's right below the floor of the

6 second floor, I guess. I mean, it's in the subfloor.

7 The elevator, did you get that one? I don't even know

8 what they came up with there.

9 Q. Are you saying there was a waterline in the
10 elevator shaft?

11 A. Yeah, I think there was, wasn't there?

12 Q. Where did you observe that waterline in the
13 elevator shaft?

14 A. I observed the line, but I don't know where it
15 was as far as inches.

16 Q. From -- from what point -- let me ask it again.
17 Were you on the first floor looking up in
18 the elevator shaft to observe that line?

19 A. Yes, sir.

20 Q. Are you able to estimate how -- what the height
21 of that line in the elevator shaft was?

22 A. We actually measured. I don't remember. I
23 really don't. I think I was holding the dummy when we
24 measured it.

25 Q. If you could turn to --

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

THIS DOCUMENT RELATES TO:

DEPOSITION OF JANA CANAN BEYOGLU

9-18-18 HOUSTON, TEXAS



DEPOSITION OF JANA CANAN BEYOGLU

DEPOSITION AND ANSWERS of JANA CANAN BEYOGLU, taken before Edith A. Boggs, a certified shorthand reporter in Harris County for the State of Texas, taken at the law offices of Neel, Hooper & Banes, PC, 1800 West Loop South, Suite 1750, Houston, Texas, on the 18th day of September, 2018, between the hours of 1:49 p.m. and 5:06 p.m.

1 A. No, I don't, definitely.

2 You see my massage chair also? I'm sorry,
3 it was an antique but it was really important for me.
4 You know, it was very, very important for me.

5 Q. Well, just generally, you don't agree with the
6 valuations of the insurance --

7 A. No. No, because they did drop it a lot.

8 Q. All right. And you said your husband is
9 working on the diminution in value of the house with an
10 appraiser?

11 A. Yes, he is. Yes, he is.

12 Q. Ma'am, just one more question. If you had --
13 if the dams were not there, would your purchase decision
14 be different?

15 A. Yes, it would be different.

16 MR. BANES: Pass the witness.

17 FURTHER EXAMINATION

18 Q. (BY MS. SANTACRUZ) Okay. Just a couple
19 follow-up questions on that, and we're primarily going
20 to be focusing on this Exhibit 9, the claim adjuster
21 report. You mentioned something about the claim
22 adjuster measuring the level of how high the water came
23 in?

24 A. Well, because there were marks on the walls,
25 like inside and outside of the house. The water,

1 because it stayed, I guess, that long, it marked on the
2 Sheetrocks.

3 Q. Okay.

4 A. So, he measured it, I guess.

5 Q. He measured it, and you were there when he
6 measured it?

7 A. I wasn't. My husband but that's what he told
8 me, that that's how they came up with the four feet.

9 Q. So, according to you --

10 A. Our -- I'm sorry. Our contractor was with the
11 insurance company also. I'm remembering that because he
12 wanted to be there so he knows where to -- how far that
13 he can cut the Sheetrocks.

14 Q. So, your husband will know better than you what
15 was the amount if he was the one that met with the claim
16 insurance adjuster?

17 A. That's true.

18 Q. You mentioned that he included it in some
19 report. I don't see it in this report. Do you know
20 another report that he completed?

21 A. I really don't know. I don't know, but if
22 there is one, I'm sure our contractor has it because
23 that's how -- that's how they know, I guess, where to
24 shut the Sheetrocks and how far to go to the mold and
25 the humidities and wetness in the Sheetrock. So, I'm

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO)
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 DANA CUTTS

9
 JUNE 27, 2018
10 -----

11
12 ORAL DEPOSITION OF DANA CUTTS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 27th day of June, 2018, from 9:07 a.m. to
16 2:55 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at the
18 offices of McGehee, Chang, Landgraf, 10370 Richmond
19 Avenue, Suite 1300, Houston, Texas 77042, pursuant to
20 the Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 outside and measuring how deep it was around the
2 foundation. Putting out appeals for volunteers to come
3 and help us. They -- people came and picked up all of
4 our carpet and threw it out in the front, that were
5 volunteers. The next day they came back with a crew and
6 took about two-thirds of our Sheetrock off up to the
7 4-foot level. And that was it.

8 Q. Okay.

9 A. And threw out most of our stuff. And of
10 course, wrecked the front lawn because they threw it all
11 out the windows right onto the lawn.

12 Q. Okay. How high did the water get at your -- at
13 your home?

14 A. It was 5 inches in some places and 8 inches in
15 others inside the house.

16 Q. Okay. And how about outside the house?

17 A. Outside, it was between 11 and 12 inches is
18 what we measured.

19 Q. Okay. I'm going to mark a set of pictures as
20 Exhibit 15.

21 (Exhibit 15 marked.)

22 Q. (BY MS. DUNCAN) Mrs. Cutts, take a look at
23 these.

24 A. Sure. Thank you.

25 Q. These were provided to us from your attorney.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE DOWNSTREAM : Sub-Master Docket

3 ADDICKS AND BARKER : No. 17-cv-9002L

(TEXAS) FLOOD-CONTROL :

4 RESERVOIRS : Judge Susan G.

: Braden

5 :

THIS DOCUMENT RELATES :

6 TO: :

ALL TEST PROPERTIES :

7
8 * * *

9 MONDAY, SEPTEMBER 17, 2018

10 * * *

11
12 Oral deposition of INGA GODEJORD taken
13 at the law offices of Neel, Hooper & Banes,
14 P.C. 1800 West Loop South, Suite 1750,
15 Houston, Texas, commencing at 1:01 p.m.
16 before Debbie Leonard, Registered Diplomate
17 Reporter, Certified Realtime Reporter.
18
19
20
21
22

23 * * *

1 sorry.

2 BY MS. HELD:

3 Q. And this is still while you're
4 in Canada, these photos were taken?

5 A. Yes, ma'am.

6 Q. Now, besides the Stackhouses,
7 were you communicating with anyone else in
8 your neighborhood about flooding while you
9 were in Canada?

10 A. No. Only with Stackhouses.

11 Q. And were you communicating with
12 anyone else in Houston that was going to your
13 neighborhood to observe the flooding for you
14 while you were in Canada?

15 A. Only my son.

16 Q. So do you know how high the
17 water reached in your house?

18 A. According to my husband,
19 2 feet.

20 Q. But did you make any
21 observations yourself?

22 A. I saw the water line. It was
23 approximately 2 feet high.

24 Q. And do you have any photographs
25 of the water line?

IN THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE UPSTREAM ADDICKS §
AND BARKER (TEXAS) §
FLOOD-CONTROL RESERVOIRS § SUB-MASTER DOCKET

§ NO. 17-cv-9002L

____ §
§ Chief Judge Susan G. Braden

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

____ §

ORAL DEPOSITION

MR. JEREMY E. GOOD

July 19, 2018

ORAL DEPOSITION OF MR. JEREMY E. GOOD, produced
as a witness at the instance of the United States and
duly sworn, was taken in the above-styled and
numbered cause on the 19th day of July, 2018, from

a.m. to 12:23 p.m., before Michelle Hartman, 9:00
Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Raizner Slania, LLP, 2402 Dunlavy Street, Houston,
Texas 77006, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached hereto.

1 the middle of the unit.

2 Q. Okay. And were the -- is this building
3 fairly flat? Is the -- were the water levels pretty
4 much the same in the downstairs unit, both front and
5 back?

6 A. It is a relatively flat elevation, yes,
7 so I would guess that it was the same throughout both
8 the units, A and C.

9 Q. And so as you sit here today, do you
10 recall whether or not the flood waters reached the
11 windows?

12 A. Again, I would have to go back and
13 measure the windows from inside to see. I don't
14 unfortunately have a picture of that here in front of
15 me.

16 Q. I don't quite understand your last
17 answer. I just want to know whether you have a
18 recollection as you sit here today as to whether the
19 flood waters ever got as high as the windows?

20 A. Not knowing how high the windows are, I
21 don't know that information. If they're within the
22 38 to 40 inches, the bottom of where we had measured,
23 then I would say yes.

24 Q. But you don't recall sitting -- you
25 don't recall any water marks on a window, for

1 water mark line is.

2 Q. Yes, that was going to be my -- my
3 question: Where -- you can tell me where the water
4 mark is in this photo?

5 A. It appears to be -- the shading looks
6 to be to the left of my thumb, which is at the top of
7 the image, and if I were to turn the measurement on
8 its side, it looks approximately to be 41 inches.

9 MR. DAIN: I believe we got these in a
10 black-and-white format. Do you have them in a color
11 format?

12 MR. WICKERT: I think so.

13 MR. DAIN: We don't have to resolve it
14 here, but I might as well state it on the record that
15 I would like to get a clarification on this photo.

16 MR. WICKERT: Well, can we go off for
17 a moment?

18 MR. DAIN: Sure, sure, we can any
19 time.

20 (Recess taken)

21 Q. (BY MR. DAIN) Outside of these photos,
22 as you sit here, do you have any better way to
23 identify the actual height of the water that the
24 water reached within your property?

25 A. Outside these specific three photos?

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 WAYNE HOLLIS
10 JULY 19, 2018
11 -----

12 ORAL DEPOSITION OF WAYNE HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 8:59 a.m. to
16 12:13 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.

<p style="text-align: right;">Page 50</p> <p>1 A. Only clothes and stuff we got out of the water 2 in the lower hangers downstairs. The furniture was all 3 already under water. Everything was ruined downstairs. 4 Q. And about how long did you stay at the house on 5 the 29th? 6 A. Probably an hour, hour and a half. 7 Q. And did you have neighbors who were still 8 trying to stay in their homes? 9 A. Trying to salvage medicines and things like 10 that. 11 No. Everybody had evacuated by then. 12 Q. And were you able to salvage some medicines to 13 bring -- 14 A. Some -- 15 Q. -- back? 16 A. Some medicines, some clothes. 17 THE REPORTER: Will you just try to wait 18 until she finishes, please? 19 THE WITNESS: Okay. 20 Q. (BY MS. TARDIFF) And so on -- on the 30th, 21 which is Wednesday, I believe. Yes. So the 29th was 22 Tuesday. The 30th was Wednesday. About what time did 23 you return by boat on the 30th? 24 A. Around noon again, also. 25 Q. And again, what were your observations about</p>	<p style="text-align: right;">Page 52</p> <p>1 water had receded and they had closed the gates on the 2 dam. 3 Q. And when you returned on the -- on the 8th or 4 the 9th, who -- who returned with you on that day? 5 A. Peggy, my son, and about 20 volunteers. 6 Q. And I'm going to ask you to kind of describe 7 your observations. Do you need a break at any time? 8 A. Pardon me? 9 Q. Do you need a break before we kind of go 10 through that? 11 A. No. 12 Q. Okay. If you do at any time, just let me know. 13 Okay. So about -- and do you know whether 14 it's the 8th or 9th or just sometime -- 15 A. I would say the 9th. 16 Q. Okay. All right. I think I saw a note to that 17 effect, so that sounds right. 18 So when you returned on the 9th, do you 19 recall what time you returned? 20 A. Mid-morning. 21 Q. Okay. Was there -- was there any water still 22 in the streets? 23 A. No. 24 Q. Okay. How about any -- any water remaining in 25 your yard?</p>
<p style="text-align: right;">Page 51</p> <p>1 the water levels in the street at that time? 2 A. It had risen another 10 to 12 inches. 3 Q. And your estimate of it having risen another 10 4 to 12 inches, were you looking at mailboxes? windows? 5 What were you looking at to kind of gauge the level? 6 A. Mailboxes, street signs. 7 Q. Okay. And again, can you describe for me, 8 you're able to get into your house again on the 30th? 9 A. Yes. 10 Q. And you had said the water was kind of above 11 your waist at that point. 12 A. Yes. 13 Q. So about how much higher was it in the house? 14 A. It reached a total of about 42 to 44 inches. 15 Q. Was it -- was it that high on the 30th? 16 A. Yes. I have a video of it. Y'all have a 17 record of it, and you can see. 18 Q. Yeah. Yeah. 19 And that's the highest that the water 20 reached in your house, as far as you know? 21 A. No. It would -- I feel it went higher, but we 22 never went back until... 23 Q. So after the 30th, when -- when was the next 24 time you were able to return? 25 A. September the 8th or 9th -- the 9th, when the</p>	<p style="text-align: right;">Page 53</p> <p>1 A. No. 2 Q. Okay. Was there any -- I understand your home 3 was certainly still wet inside, but was there any 4 standing water in your home or had it drained away? 5 A. Yes. There was sludge and water retained in 6 the home. 7 Q. And based on your observations in the home at 8 that time, you know, what's your estimate of -- as to 9 how high the water got in your home while you were away? 10 A. About 43 to 45 inches. 11 Q. And so the -- the water itself stayed on the 12 first floor. You didn't get any water on the second 13 floor aside from water that was brought up when you 14 moved? 15 A. Correct. 16 Q. Okay. Any -- any other rainwater getting into 17 the upper levels of your home through windows or the 18 roof or anything? 19 A. No. 20 Q. And did you actually start kind of salvage 21 operations in your home on the 9th in terms of removing 22 things? 23 A. Yes. 24 Q. And about how long -- how many -- was that a 25 period of days or weeks?</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
 ORAL DEPOSITION OF

8
 ARNOLD MILTON

9
 JULY 10, 2018
10 -----

11
12 ORAL DEPOSITION OF ARNOLD MILTON, produced as
13 a witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 10th day of July, 2018, from 9:02 a.m. to
16 2:48 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 Harvey, those windows hadn't been open?

2 A. Never.

3 Q. None of them?

4 A. None of them.

5 Q. Did the fact that you couldn't open your
6 windows ever present a problem for you and your wife
7 over that number of years?

8 A. It interfered with my shooting squirrels with
9 my BB gun; but otherwise, it didn't. Fortunately, if
10 the air conditioner broke, the wife had it fixed
11 immediately. And there was never any argument about
12 that. So never a real problem.

13 Q. I've seen a number of pictures from your home
14 showing measurements of a waterline following Harvey?

15 A. Uh-huh. Uh-huh. Yes. Yes.

16 Q. Are those pictures that you took?

17 A. Yes.

18 Q. Was that waterline fairly consistent throughout
19 the interior of the home?

20 A. Very, uh-huh.

21 Q. Was that waterline consistent on the exterior
22 of the home?

23 A. Yes.

24 Q. Was that waterline roughly the same on the
25 interior and exterior?

1 A. Yes.

2 Q. Was it exactly the same?

3 A. Well, the floor varied a little bit.

4 Especially with a sunken living room, you're talking

5 about maybe a maximum 2-inch variation.

6 Q. Do you know what the height of that inundation

7 was?

8 A. Oh, we measured it in several spots and it was,

9 what, 4 foot 3 and 3 quarters or something like that.

10 Q. Your friend and neighbor Mr. Hamblin --

11 A. Uh-huh.

12 Q. Let me start the question again.

13 Did Mr. Hamblin also have an inundation
14 line on his home?

15 A. Yes, he did.

16 Q. Was the inundation line on Mr. Hamblin's home
17 at a similar height to the inundation line on your home?

18 A. Yeah.

19 Q. And how do you know that?

20 A. Well, I could see it on his windows. He had
21 the house steam cleaned on the exterior before I did.
22 But there was no question about it right after the
23 flood. In fact, the same mark was on all of the houses
24 unless they were higher up the street where it tended to
25 be a little bit lower.

THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE: DOWNSTREAM ADDICKS)
AND BARKER (TEXAS))
FLOOD-CONTROL RESERVOIRS)
) SUB-MASTER DOCKET NO.
) 17-CV-90021
)

ORAL DEPOSITION OF

JENNIFER SHIPOS

September 19, 2018

Volume 1

ORAL AND VIDEOTAPED DEPOSITION OF JENNIFER SHIPOS,
produced as a witness at the instance of the DEFENDANT,
was taken in the above-styled and numbered cause on
September 19, 2018 from 3:02 p.m. to 5:05 p.m., before
Toyloria Lanay Hunter, CSR in and for the State of
Texas, reported by machine shorthand, at the law offices
of NEEL, HOOPER & BANES, P.C., 1800 West Loop South,
Suite 1750, Houston, Texas 77027, pursuant to the
Federal Rules of Civil Procedure and the provisions
stated on the record or attached hereto.

1 photographs on the interior of your house.

2 A. Okay.

3 Q. The next photograph, 000230, what's portrayed
4 in that photograph?

5 A. This is my hallway. And I have an antique
6 hutch here in the entrance way.

7 Q. How deep was the water there, if you know?

8 A. I would say it's probably around at that time,
9 12 to 15 inches.

10 Q. Okay. And what do you base that on?

11 A. I think I just recall it being -- I think we
12 tried to mark all the watermarks on it.

13 Q. How long did it take the water to recede from
14 the interior of the house?

15 A. Six days.

16 Q. After the six days, do you remember seeing any
17 watermarks on the walls?

18 A. Yes.

19 Q. Was that all around the first floor?

20 A. Yes.

21 Q. And in the garage?

22 A. Yes.

23 Q. Did you have any watermarks in the exterior of
24 the house?

25 A. Yes.

1 Q. Next photograph, 000224?

2 A. That would be my kitchen.

3 Q. Is the water approximately the same depth?

4 A. Yes.

5 Q. The next one?

6 A. This is my family room.

7 Q. For the record, 000226. That's -- I'm sorry,
8 your living room?

9 A. Yeah. Well, this is the family room, is what
10 I call it.

11 Q. And in the picture, is that --

12 A. I have a leather couch and a leather love -- I
13 guess armchair.

14 Q. Uh-huh.

15 A. And some end tables.

16 Q. Are the end tables up on the furniture?

17 A. Yes.

18 Q. Okay. Next photograph, 000227?

19 A. This would be my breakfast area.

20 Q. Uh-huh.

21 A. And my -- I guess my dining room -- I guess my
22 table. My kitchen table.

23 Q. Were there chairs in there before the storm?

24 A. Yes. Those I did carry up the stairs.

25 Q. The depth of the area water about the same as

1 the other area?

2 A. It was a little bit higher than the back of
3 the house.

4 Q. Next photograph, 000229?

5 A. That is my dining room table.

6 Q. The water -- is depth of the water about the
7 same?

8 A. Yes.

9 Q. And I can see you have -- are those dining
10 room chairs up on the table?

11 A. Yes. And I have a -- well, you can't see my
12 rug. But I have a nice area rug there too.

13 Q. Next photograph, 000239?

14 A. This would be my living room looking into the
15 dining room too.

16 Q. And the depth of the water there?

17 A. It's about 15 inches.

18 Q. Next photograph?

19 A. A bathroom.

20 Q. 000228. And the depth of the water there is
21 about the same?

22 A. Yes.

23 Q. Looking through the other photographs, the
24 remainder of the photographs --

25 A. Uh-huh, yeah. These are probably repeats --

1 Q. The next one --

2 A. Yeah, you can't really see this. This is my
3 study.

4 Q. Next one, 000235?

5 A. Yeah, one of my antiques from the study.

6 Q. That was in the study?

7 A. Uh-huh. It's an antique.

8 Q. Why is it -- what's -- what is it exactly?

9 A. I think it's like 19-- I don't remember the
10 date.

11 Q. I'm sorry. What is it --

12 A. Oh, what is it? It's just kind of a hutch.

13 Q. A hutch?

14 A. Yeah.

15 Q. 000236, that's the --

16 A. That's the entrance way, yeah.

17 Q. Antique in the entrance way?

18 A. Uh-huh.

19 Q. And then the last one, 000237?

20 A. That's the backyard.

21 Q. Okay. About how deep was the water in the
22 backyard?

23 A. That one was a little -- for some reason, that
24 one was a little higher, maybe 18 inches. Just slightly
25 higher.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF

9 PETER SILVERMAN

10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF PETER SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 9:06 a.m. to
16 3:52 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.
23
24
25

1 water was in my home would be like waterlines where you
2 can actually -- one could see a waterline of how much
3 water was in the home. But what, when, and where, I
4 don't know. I was not there.

5 Q. (BY MS. IZFAR) So when you walked into your
6 home on September 8th, did you see any waterlines?

7 A. Yes.

8 Q. Did you take any pictures of those waterlines?

9 A. I don't recall taking any pictures on the 8th.

10 Q. Did you take any measurements of the
11 waterlines?

12 A. I never took any measurements. I don't carry a
13 tape measure with me on my person or in my car, so I can
14 clearly say, no, I would not have done that.

15 Q. Okay. Do you have an estimate as to how high
16 the waterline was on September 8th?

17 A. In my own mind I have an estimate, yes.

18 Q. What's the estimate?

19 A. I use a foot to 18 inches depending on where in
20 the house you are.

21 Q. And when you say "depending on where in the
22 house you are," can you describe where the water was --
23 where the watermark was higher?

24 A. The farther away from the street you go, I
25 would say the waterline would be higher.

1 Q. So, for example -- and let's go back to -- I
2 think it's Exhibit 2 -- no, Exhibit 3, this floor plan.
3 Can you mark on -- on Exhibit 3 where the water -- where
4 the high watermarks were approximately 12 inches?

5 A. No. But it goes back to sort of a question you
6 asked earlier which I said I don't know. You said --
7 you asked my, like, can you point out the low spots of
8 my house. That was hard for me to do at the time except
9 to tell you that the highest points are here and the
10 lowest points are here (indicating).

11 Q. Okay. Understood. So would you say --

12 MS. IZFAR: And let the record reflect that
13 the witness pointed to the front of the house when
14 pointing out the highest spots, and pointed to the back
15 of the house when pointing out the lowest spots.

16 Q. (BY MS. IZFAR) Could you draw a picture on the
17 floor plan and just indicate where the highest spots are
18 and where the lowest spots are. Can you just draw a
19 line out to the front part that says "highest" and
20 then -- and then the back of the house which says
21 "lowest" so that we have some frame of reference.

22 A. (Witness complies.)

23 Q. So during Harvey the lowest spots near the back
24 of the house had about 18 inches; is that your estimate?

25 MR. HODGE: Objection; form. That

1 misstates his testimony.

2 A. Again, that would be my guess. But I really
3 never measured it. But after -- after the dam releases
4 occurred and the water and sewage sat in the house, I
5 would guess -- and, again, it's speculation -- that the
6 highest -- that it was never above 18 inches in any
7 spot. I think that would have been a high.

8 Q. (BY MS. IZFAR) Okay.

9 A. And so an average whatever like that. I
10 wouldn't know an average or anything like that. But I
11 wouldn't -- from what I can tell from anything I saw, it
12 was not higher than that from my uneducated flood eyes.

13 Q. Understood. So did anyone do -- did anyone
14 conduct a professional assessment as to how high the
15 water was in your house?

16 A. I believe the flood adjuster would have
17 commented on that.

18 Q. When did you call the flood adjuster?

19 A. I filed a claim as soon as possible on or about
20 September 1st, I would say.

21 Q. Okay. And this is -- you filed a claim then
22 with your NFIP insurance?

23 A. Yes. Or -- I'm not sure if it's fair to say
24 that or with FEMA. But I went online and I clicked the
25 boxes to put myself in the system.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF

9 ZHENNIA SILVERMAN

10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF ZHENNIA SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 4:05 p.m. to
16 5:34 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.
23
24
25

1 Exhibit 1 -- 23, Exhibit 23.

2 Q. Okay. Understood. And is it your
3 understanding that these pictures were taken on
4 August 31st?

5 A. I think so, yes. Only because of the way this
6 was printed, I'm not sure where they were embedded. And
7 just so -- but just by looking at the -- at the date and
8 the time of the e-mails. Oh, here we go. Yeah, this
9 looks like August -- well, that was me forwarding to
10 Nick, hold on. Okay. Yeah, I mean, I have no reason to
11 believe that they weren't -- that these were e-mailed on
12 the 31st.

13 Q. Okay. Looking --

14 A. And if you look at the very last -- it says
15 "Pics from your house, 10:00 a.m., August 31st." And
16 that's the -- the last three pages.

17 Q. The last three pages of Exhibit 3 where Nick
18 has written to you --

19 A. In the subject line.

20 Q. Oh, got it. Got it. Understood. Pics from --
21 in the subject line from Nick Speller to you on
22 August 31st at maybe 5:37, but unclear what time zone,
23 "Pics from your house, August 31st, 2017.

24 Okay. Thank you. Looking at these
25 pictures here, do you have an estimate as to how high

1 the water is?

2 MR. HODGE: Objection; form.

3 A. No. I remember one of the first ones that I
4 looked at was of our front door where we've got this
5 elephant that we bought in Indonesia with a pot on top
6 of it. And as I looked inside the house through those
7 glass doors, it appeared -- appeared to me at that time
8 that the water had risen up to the level of the armrest
9 on the chair. And I remember talking to my husband
10 about it. And so that was -- and then of course seeing
11 my mailbox that was pretty --

12 Q. (BY MS. IZFAR) So right now just to be clear
13 for the record, you're looking at the second to last
14 page of the Exhibit 23, and you're looking at the --

15 A. The third.

16 Q. Wait. The third image which is IMG --
17 captioned "IMG_0846.jpg"?

18 A. Uh-huh. That's correct.

19 Q. Okay. And is it your understanding that these
20 pictures were also taken on August 31st by your neighbor
21 Nick?

22 A. Correct.

23 Q. All right. Did you have any other photographs
24 of your -- of your home between August 27th and
25 September 8th?

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE: DOWNSTREAM *

ADDICKS AND BARKER *

(TEXAS) FLOOD CONTROL *

RESERVOIRS * SUB-MASTER DOCKET NO.

* 17-cv-9002L

THIS DOCUMENT RELATES TO:*

ALL DOWNSTREAM CASES *

ORAL DEPOSITION OF DUTCH CHRISTOPHER LINDEBURG

VOLUME 1

SEPTEMBER 26, 2018

ORAL DEPOSITION of DUTCH CHRISTOPHER LINDEBURG,
produced as a witness at the instance of the United
States, and duly sworn, was taken in the above-styled
and numbered cause on September 26, 2018, from 4:19
p.m. to 6:14 p.m., before Carol Jenkins, CSR, RPR,
CRR, in and for the State of Texas, reported by
machine shorthand, at the Potts Law Firm, 3737 Buffalo
Speedway, Suite 1900, Houston, Texas 77098, pursuant
to notice and the Federal Rules of Civil Procedure.

1 MR. POTTS: I don't have any further
2 questions.

3 MR. DAIN: I just have one question to
4 follow-up.

5 FURTHER EXAMINATION

6 BY MR. DAIN:

7 Q. For the visit on the 29th, is that the
8 deepest you ever saw the water?

9 A. That is the deepest I saw it, yes.

10 Q. How deep was it off the floor of the basement
11 or the first floor?

12 A. I mean, it came over the doorjamb because
13 there's loading doors in the back that go to kind of a
14 ramp that lead to the parking lot and so, I mean,
15 Shawn -- I sent Shawn a picture of it. So we should
16 be able to tell from that.

17 Q. Okay.

18 A. Maybe, I mean. I think that phone got
19 destroyed. I can't seem to find that one. Maybe it's
20 on Facebook. I don't know.

21 Q. Let me just --

22 MR. POTTS: Look at this. Is this it?

<p style="text-align: right;">Page 58</p> <p>1 A. No.</p> <p>2 Q. Okay. All right. We can set this aside</p> <p>3 for now.</p> <p>4 Okay. I'm going to ask you a few</p> <p>5 questions now about what happened during Harvey.</p> <p>6 And I've got a -- blank calendars somewhere in front</p> <p>7 of you. So feel free to refer to them if you have</p> <p>8 trouble recalling certain dates.</p> <p>9 A. Okay.</p> <p>10 Q. When did you first hear about the</p> <p>11 possibility that a storm like Harvey was coming?</p> <p>12 A. I think probably whenever the -- the TV,</p> <p>13 you know, stations started reporting it. I don't</p> <p>14 know exactly when that was, but sometime a couple of</p> <p>15 days before it hit.</p> <p>16 Q. Okay. At that time -- well, do you --</p> <p>17 can you give an estimate as to what date that was?</p> <p>18 A. You know, as I recall, this was a</p> <p>19 hurricane that kind of went away and came back from</p> <p>20 the dead again and just flared up pretty quickly.</p> <p>21 Probably the 21st or 22nd.</p> <p>22 Q. Okay. Would you have any text or e-mails</p> <p>23 or anything to show when you first knew about when</p> <p>24 the hurricane was coming?</p> <p>25 A. No.</p>	<p style="text-align: right;">Page 60</p> <p>1 neighborhood was -- was about under water and we</p> <p>2 would have been marooned.</p> <p>3 Q. When you say the entryway to your</p> <p>4 neighborhood, was -- was there -- is that a specific</p> <p>5 street?</p> <p>6 A. It's --</p> <p>7 Q. Are you looking at Exhibit 1?</p> <p>8 A. Yeah, I'm looking at Exhibit 1. It's the</p> <p>9 entrance at La Costa and Memorial.</p> <p>10 Q. Okay. How do you know that La Costa and</p> <p>11 Memorial were becoming impassable?</p> <p>12 A. We had gone down there to see it. I</p> <p>13 think my daughter had -- had driven down there and</p> <p>14 seen that it was filling up pretty quick.</p> <p>15 Q. Okay. Was -- when did water first enter</p> <p>16 your home?</p> <p>17 A. I wasn't on the property when that</p> <p>18 happened.</p> <p>19 Q. Okay. So it was after August 29th?</p> <p>20 A. It was after I evacuated.</p> <p>21 Q. Okay. And you evacuated on August 29th?</p> <p>22 A. Yes, sometime -- 4:00 o'clock in the</p> <p>23 afternoon, 5:00 o'clock.</p> <p>24 Q. And water entered your home after you</p> <p>25 evacuated?</p>
<p style="text-align: right;">Page 59</p> <p>1 Q. Okay. When you heard that Harvey was</p> <p>2 coming, did you prepare in any way?</p> <p>3 A. No.</p> <p>4 Q. Okay. Did you bring in sandbags at all?</p> <p>5 A. No.</p> <p>6 Q. Did you move any personal property</p> <p>7 upstairs?</p> <p>8 A. No.</p> <p>9 Q. Did you elevate any of your property or</p> <p>10 move it to higher ground?</p> <p>11 A. No.</p> <p>12 Q. Did you expect any flooding?</p> <p>13 A. No.</p> <p>14 Q. Why not?</p> <p>15 A. It was just a storm like a lot of other</p> <p>16 storms.</p> <p>17 Q. Okay. Did you plan to evacuate at all?</p> <p>18 A. No.</p> <p>19 Q. Did you evacuate at any point?</p> <p>20 A. We did on the 29th.</p> <p>21 Q. Why did you evacuate on the 29th?</p> <p>22 A. Well, the water was getting higher to the</p> <p>23 point where we -- if we were going to get out at</p> <p>24 all, we had to get out probably toward the latter</p> <p>25 part of that afternoon, because the entryway to our</p>	<p style="text-align: right;">Page 61</p> <p>1 A. That's right.</p> <p>2 Q. Do you have an estimate as to when the</p> <p>3 water entered your home?</p> <p>4 A. No.</p> <p>5 Q. Okay. Where'd you go when you were</p> <p>6 evacuated?</p> <p>7 A. To my daughter's house.</p> <p>8 Q. Where does she live?</p> <p>9 A. She lives in Fairfield, which is at 290</p> <p>10 and the Grand Parkway.</p> <p>11 Q. And did she get any flooding?</p> <p>12 A. No.</p> <p>13 Q. Okay. And how long did you stay there</p> <p>14 for?</p> <p>15 A. Well, we -- my wife stayed there until</p> <p>16 probably -- you know, through the better part of</p> <p>17 October or November. I came back to the house a</p> <p>18 couple of weeks later and lived upstairs to, you</p> <p>19 know, manage the repairs and recovery.</p> <p>20 Q. Okay. When you first -- when did you</p> <p>21 first return to your home after Harvey?</p> <p>22 A. So we came back the 31st, I guess. It</p> <p>23 would be a Thursday, the 31st.</p> <p>24 Q. Do you recall what time?</p> <p>25 A. Probably midmorning, maybe 10:00 o'clock.</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 PHILLIP AZAR

9
 JULY 9, 2018
10 -----

11
12 ORAL DEPOSITION OF PHILLIP AZAR, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 9th day of July, 2018, from 9:02 a.m. to
16 5:03 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Kirby
18 Mansion, 2000 Smith Street, Suite 550, Houston, Texas
19 77002, pursuant to the Federal Rules of Civil Procedure
20 and the provisions stated on the record or attached
21 hereto; that the deposition shall be read and signed
22 before any notary public.

1 A. Correct. Yes.

2 Q. And were you at the 3 Magnolia Bend property
3 during Harvey?

4 A. No. I was here.

5 Q. Okay. Was anyone in your family at the
6 3 Magnolia Bend property during Harvey?

7 A. Yeah. Dolly -- the same ones I just gave you,
8 Dolly, Jimmy, and Diloires. They were all there.

9 Q. Were they there throughout the entirety of the
10 storm?

11 A. Until I called and I think Diloires called, too,
12 or one of them called, the sheriff's or 911 and they --
13 they got picked up by a boat.

14 Q. Do you know on what day they were picked up by
15 the boat?

16 A. I want to say the 28th or the 27th, 28th.

17 Q. Do you -- do you know what time of day they
18 were picked up?

19 A. Not really. I think it was light.

20 Q. It was daylight?

21 A. During the day. Yes, sir. So probably the
22 28th.

23 Q. Okay. So you think that your brother Jimmy and
24 sisters, Diloires and Dolly, were picked up by a boat
25 during the day on the 28th of August 2017?

1 A. Correct. They were taken over to around the
2 10,000 block of Memorial; Episcopal church or a
3 Methodist church, one of those churches there, 10,000
4 block of Memorial.

5 Q. Do any of your siblings own a property interest
6 in the 3 Magnolia Bend property?

7 A. No. No, sir.

8 Q. Did any of your siblings own personal property
9 that was in the 3 Magnolia Bend property during Harvey?

10 A. Yes.

11 Q. Is any of your siblings' personal property that
12 was in the 3 Magnolia Bend home during Harvey at issue
13 in this litigation?

14 A. Better explain that to me. At issue?

15 Q. Sorry. Let -- let me try and ask it again.

16 A. Sure.

17 Q. Is any of your siblings' personal property
18 subject to your claims in this matter?

19 A. Yes.

20 Q. Are -- are any of your siblings named
21 plaintiffs in this matter?

22 A. No.

23 Q. Do you recall seeing the United States'
24 interrogatories in this matter?

25 A. Yes.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO)
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 DANA CUTTS

9
 JUNE 27, 2018
10 -----

11
12 ORAL DEPOSITION OF DANA CUTTS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 27th day of June, 2018, from 9:07 a.m. to
16 2:55 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at the
18 offices of McGehee, Chang, Landgraf, 10370 Richmond
19 Avenue, Suite 1300, Houston, Texas 77042, pursuant to
20 the Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 Q. And that by the 29th, portions of the back lawn
2 and front lawn had water.

3 A. Yes.

4 Q. At that point, were the streets full of water?

5 A. Yes.

6 Q. Okay. And then the water was coming from the
7 street into your front lawn?

8 A. Yes.

9 Q. Okay. And then water in the back lawn, where
10 was that coming from?

11 A. It had just crept to the fence line and a
12 little bit under our fence, and that was as far as it
13 had gotten.

14 Q. And was that water coming from the ditch behind
15 your home?

16 A. Yes, it was. Well, I believe -- yeah, I
17 believe it was.

18 Q. Okay. At what date -- what date did you
19 evacuate your home?

20 A. We evacuated on Wednesday, August the 30th.

21 Q. Okay. And what time did you leave?

22 A. About 7:30 in the morning, a.m.

23 Q. And how did you leave?

24 A. By kayak.

25 Q. And where did you go?

1 A. We went to an enormous monster SUV parked in my
2 neighbor's driveway. And we sat in the back cab of that
3 SUV hunched over for over two hours while 14 other
4 people were collected to be rescued. And then we were
5 driven to our destinations, whatever they might be.

6 Q. And where was your ultimate destination?

7 A. It was across the Sam Houston Tollway over in
8 Briar Grove Park. We had friends that had invited us to
9 come. We were also the last ones dropped off. So we
10 had probably almost a four hour hunch-over sitting in
11 the back of that cab.

12 Q. Between August 29th and when you left your home
13 on August 30th, can you describe the timeline of how the
14 water rose?

15 A. Well, the water rose through the 28th, Monday
16 the 28th. The storm ended; the water receded. We put
17 our things back down because we were not going to flood.
18 It was very evident. The sun came out and we all came
19 out and we were congratulating ourselves that we had
20 made it through the storm and we had not flooded. We
21 started putting our things back down.

22 At some point -- and I'm not sure if it was
23 Monday late or Tuesday, I think it was Monday -- the
24 waters -- Tuesday, the water started coming up. We
25 stood out and we were aghast, all of us. We could not

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE DOWNSTREAM : Sub-Master Docket

3 ADDICKS AND BARKER : No. 17-cv-9002L

(TEXAS) FLOOD-CONTROL :

4 RESERVOIRS :

: Judge Susan G.

: Braden

5 THIS DOCUMENT RELATES :

6 TO: :

:

7 ALL TEST PROPERTIES :

8 * * *

9 MONDAY, SEPTEMBER 17, 2018

10 * * *

11
12 Oral deposition of ARNSTEIN GODEJORD
13 taken at the law offices of Neel, Hooper &
14 Banes, P.C. 1800 West Loop South, Suite 1750,
15 Houston, Texas, commencing at 9:07 a.m.
16 before Debbie Leonard, Registered Diplomate
17 Reporter, Certified Realtime Reporter.

18
19
20
21
22
23 * * *

1 during Hurricane Harvey?

2 A. At the risk of flooding, I
3 think I learned when my son called us and say
4 that they are releasing the water. He had
5 heard that on the news, and he said that he
6 might have to evacuate the house.

7 Q. And where were you and your
8 wife at this time?

9 A. In Canada.

10 Q. So was there anyone at your
11 house other than your son?

12 A. Yes, there was one -- one
13 person visiting us at that point. So there
14 were two.

15 Q. And how old was your son?

16 A. Well, he's 26 now, so he was 25
17 at that time.

18 Q. So what did you do when you
19 learned that your house may need to be
20 evacuated, since you were in Canada?

21 A. Preparing to -- to go back to
22 Houston.

23 Q. Did you ask your son to do any
24 preparations at the house to prepare for a
25 potential evacuation?

1 A. I would say that he was taken
2 by surprise, because we were sort of thinking
3 we were in the clear. And then when he woke
4 up in the morning, it was water in the house.

5 Q. So he was there when the water
6 came in the house?

7 A. I think -- to be honest with
8 you, I'm not sure if he decided to evacuate
9 the day before or when there was water. But
10 he felt that he had to run, not -- didn't
11 have time to do anything. And I believe
12 that -- well, I don't know if you want me to
13 explain that more or --

14 THE WITNESS: Should I?

15 MR. BANES: Let her ask you.

16 THE WITNESS: Yeah.

17 BY MS. HELD:

18 Q. So -- so let's -- we'll
19 backtrack.

20 A. Yeah.

21 Q. So you were in Canada with your
22 wife --

23 A. Yes.

24 Q. -- and you heard from your
25 son --

IN THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE UPSTREAM ADDICKS §
AND BARKER (TEXAS) §
FLOOD-CONTROL RESERVOIRS § SUB-MASTER DOCKET

§ NO. 17-cv-9002L

____ §
§ Chief Judge Susan G. Braden

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

____ §

ORAL DEPOSITION

MR. JEREMY E. GOOD

July 19, 2018

ORAL DEPOSITION OF MR. JEREMY E. GOOD, produced
as a witness at the instance of the United States and
duly sworn, was taken in the above-styled and
numbered cause on the 19th day of July, 2018, from

a.m. to 12:23 p.m., before Michelle Hartman, 9:00
Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Raizner Slania, LLP, 2402 Dunlavy Street, Houston,
Texas 77006, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached hereto.

1 A. Sure.

2 Q. -- when the water was no longer -- was
3 no longer -- the flood level was no longer at that
4 level?

5 A. I can't speculate when the water was
6 out. The only thing I know is when the -- the
7 authorities there, I believe it was the police, said
8 that we were able to go in and access that area.

9 Q. And do you have any understanding as
10 you sit here today as to when the flood waters
11 receded from the common property of Memorial Mews?

12 A. Again, I would -- I would say I can't
13 speculate the exact dates. I just know when the
14 roads were passible.

15 Q. And I will just ask the last one too:
16 You don't know -- as you sit here today, know when
17 the banks of the creek were no longer overflowing?

18 A. I do not.

19 Q. Were the tenants required to leave the
20 property?

21 A. I'm not sure if the evacuation
22 happened. A mandatory evacuation was in place in
23 that area. So I can't speak definitively on that,
24 but my understanding with the waters rising and the
25 boats that were coming for rescues, I would surmise

1 that they were.

2 Q. Do you know whether they, in fact, left
3 the properties?

4 A. They all left the property.

5 Q. Okay. Do you know when they left the
6 property?

7 A. I do not know the exact dates other
8 than I can look at the text message here. It looks
9 like -- it doesn't indicate on this particular text
10 stream that I'm looking at. I do have one that I
11 recall with Elizabeth, who was in Unit D, that she
12 left on Tuesday, August the 29th, and I believe she
13 also was evacuated on a raft.

14 Q. Okay. So Unit D you believe left on
15 the 29th?

16 A. Correct.

17 Q. Unit C may be reflected in Exhibit 6,
18 if it's -- if you do know what date, it would be
19 because it's in this document?

20 A. It does not appear to be in this
21 document. It might be in an e-mail with -- with
22 them, but I do not see any indication on when they
23 left here. I know that they were in the unit on
24 Monday, August 28th.

25 Q. Okay. Well, then let me just ask:

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 WAYNE HOLLIS
10 JULY 19, 2018
11 -----

12 ORAL DEPOSITION OF WAYNE HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 8:59 a.m. to
16 12:13 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.

<p style="text-align: right;">Page 42</p> <p>1 Q. Okay. Any of your neighbors, if you're aware, 2 experience flooding? 3 A. No. 4 Q. And then I'll ask your wife about the 27th. 5 But do you recall from communications with her whether 6 there was any flooding in the -- in the streets on the 7 27th? 8 A. No, because I drove in that night. 9 Q. And how about on -- on Monday, August 28th? 10 Did you go to work that day? 11 A. No. I couldn't get out. 12 Q. And were there particular streets that were 13 flooded that prevented you from getting out? 14 A. Yes. 15 Q. And what streets were those? 16 A. The street we live on, River Forest. 17 Q. And in the morning of the 28th, how much water 18 did you wake up to in the street? 19 A. It was curb deep in the street and running 20 under our porte cochere. 21 Q. And so had the water come up from the street -- 22 A. Yes. They had opened the dams that night. 23 Q. -- towards your front door at that point? 24 And when you woke up on the morning of the 25 28th, did you have water in your home yet?</p>	<p style="text-align: right;">Page 44</p> <p>1 A. (Witness complies.) 2 Q. And with respect to the water, where it started 3 coming in on the side of the house, and which side is 4 that, is that east or west? 5 A. That's the east side. 6 Q. Okay. On the east side, what direction -- 7 A. And the south side -- the north side. 8 Q. Okay. So north side. 9 And then the east side, what direction was 10 the water coming in from there? Is that also -- 11 A. It was, like I say, flowing across here. And 12 it started flooding my neighbor here and my neighbor 13 here. 14 Q. And so walk me through the 28th, once water 15 started coming into your house, what you did and what 16 you saw. 17 A. Well, my neighbors, we all kind of gathered out 18 in the front. We couldn't get out, and the water 19 continued to rise. And I had my 93-year-old 20 mother-in-law living with us that we had just moved in 21 from Alabama in May. And we started trying to figure 22 out how we might get out. We couldn't get out by 23 vehicle because the streets were all totally flooded. 24 And so finally about 1:30 or so, two 25 guys -- I still don't know who they are today -- showed</p>
<p style="text-align: right;">Page 43</p> <p>1 A. It started coming in the house about 8:30. 2 Q. So let me have you walk me through Monday, the 3 28th, from the time you woke up, started -- you know, 4 observed the water outside and then experienced water 5 coming into your house around 8:30. And did that come 6 in starting in the front of your house as the water 7 rose? 8 A. It actually came in -- the first initial water 9 came in through the east end of the house through the 10 master bathroom. And then it started coming in the back 11 patio. 12 Q. Okay. So let me -- I'm going to give you a 13 black marker this time. Can you mark on -- that's 14 Exhibit 3, and we're looking at the floor plan for your 15 first floor. Mark with an X just the two locations 16 where water starting coming in. 17 A. It started coming in here and then here. 18 Q. And so was that water -- in the back of your 19 house where it first started coming in, were you seeing 20 water pooling up in your backyard? 21 A. No. It was flowing. It knocked the fence down 22 on my neighbors, and it was flowing from the northwest 23 to the southeast. 24 Q. Okay. Can you -- can you just point -- put an 25 arrow right on this exhibit, the direction?</p>	<p style="text-align: right;">Page 45</p> <p>1 up in a little catamaran that had a pontoon on each side 2 and a deck tarp in the middle. And we got -- called my 3 son. And he was able to drive within about a block and 4 a half of our house and -- down Bayou Knoll. And it 5 was, of course, raining still. And I got Peggy and her 6 mother on the little flotation device. And these guys 7 pushed them out across the yards, and we went to where 8 my son was and got everybody out of the -- and then my 9 neighbor across the street had come over, and he waited 10 out with us. 11 And my neighbor to the east, they were 12 going to try to stay. They were going to try to stay 13 upstairs. And they -- as we evacuated out, we still had 14 power. I had gone out in my garage and cut the main 15 breakers off to keep from having fire in the house. And 16 so as we got in the vehicle to go out up by the church, 17 CenterPoint was there shutting off the power. And I 18 called my neighbors and said they're shutting off your 19 power and about that time, the power went off. So 20 they -- they all evacuated. 21 Q. So that was about 1:30 in the afternoon on the 22 28th when you evacuated? 23 A. Yes. 24 Q. And I'm glad you were able to get out at that 25 time.</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
 ORAL DEPOSITION OF

8
 ARNOLD MILTON

9
 JULY 10, 2018
10 -----

11
12 ORAL DEPOSITION OF ARNOLD MILTON, produced as
13 a witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 10th day of July, 2018, from 9:02 a.m. to
16 2:48 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 Q. When you woke up on the morning of the 28th,
2 did you still have power?

3 A. Again, I'm not sure. I -- I just don't
4 remember. I don't know why we would have needed power
5 that morning. It was just a matter of collecting a few
6 things that you can grab and getting in the boat and
7 going.

8 Q. Do both you and your wife have cell phones?

9 A. Yes.

10 Q. Did you both have cell phones during Harvey?

11 A. Yes.

12 Q. Did you have your cell phones when you woke up
13 on the morning of the 28th?

14 A. I'm pretty sure we did.

15 Q. How long between when you woke up on the
16 morning of the 28th until you were evacuated?

17 A. My son-in-law came and picked us up probably
18 about, I don't know, if I had to guess maybe 10:30,
19 11:00 o'clock. Maybe as late as 2:00 o'clock but
20 somewhere towards midday.

21 Q. When you say your son-in-law picked you up,
22 where did he pick you up?

23 A. He picked us up on Memorial Drive. He was able
24 to get through. Memorial Drive was flooded and I -- I
25 think he had to come in kind of a special way, but he

1 has a big SUV and he got us out of there before it got
2 any deeper.

3 Q. How did you get from your home to the spot
4 where your son-in-law picked you up around midday on the
5 28th?

6 A. He drove us.

7 Q. I'm sorry. I think I'm a little confused. Did
8 you and your wife walk from your home to the spot on
9 Memorial Drive where your son-in-law picked you up?

10 A. No, we were taken out on a small boat. And it
11 was just a little inflatable thing that -- two or three
12 guys came by and offered to take us out. And it was
13 raining and it was fairly cool. And I -- at the time I
14 thought, you know, I can just wade out of here. I don't
15 care if the water is waist deep or deeper, but I didn't
16 want her to have to.

17 So we got in the boat and I got in there
18 with her and these guys walked us out. And the closer
19 you got to the entrance of the subdivision the shallower
20 the water was. When you finally got to Memorial, right
21 there in front of our subdivision it was still above
22 water. If you went east the water was starting to come
23 across Memorial down where the bayou comes out of the
24 Addicks Reservoir.

25 Q. Did -- did you -- do you recall the route that

THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE: DOWNSTREAM ADDICKS)
AND BARKER (TEXAS))
FLOOD-CONTROL RESERVOIRS)
) SUB-MASTER DOCKET NO.
) 17-CV-90021
)

ORAL DEPOSITION OF

JENNIFER SHIPOS

September 19, 2018

Volume 1

ORAL AND VIDEOTAPED DEPOSITION OF JENNIFER SHIPOS,
produced as a witness at the instance of the DEFENDANT,
was taken in the above-styled and numbered cause on
September 19, 2018 from 3:02 p.m. to 5:05 p.m., before
Toyloria Lanay Hunter, CSR in and for the State of
Texas, reported by machine shorthand, at the law offices
of NEEL, HOOPER & BANES, P.C., 1800 West Loop South,
Suite 1750, Houston, Texas 77027, pursuant to the
Federal Rules of Civil Procedure and the provisions
stated on the record or attached hereto.

1 Q. And then so you heard that they were going to
2 release the dams. And then you evacuated the house; is
3 that right?

4 A. Yes.

5 Q. That morning at about 10:00?

6 A. That morning on the 28th at 10:00, yes.

7 Q. 28th.

8 Now, let's take a look at Exhibit 1 for a
9 second. Keep your hand in Exhibit 11.

10 A. Okay.

11 Q. Now, I think -- you know, government's counsel
12 established pretty well that you're pretty close to the
13 dam, to the dam -- at least to the spillways?

14 A. Yes.

15 Q. Looks like you're almost at the convergence of
16 the two spillways?

17 MR. DOOHER: Object to the form.

18 MR. BANES: Sorry?

19 MR. DOOHER: Object to the form.

20 BY MR. BANES:

21 Q. Was there -- did you know of any other water
22 coming other than from the dam on the 29th?

23 A. No.

24 Q. All right. Was -- was water flowing from
25 anywhere else other than the dam; to your knowledge?

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS
3 AND BARKER (TEXAS)
4 FLOOD-CONTROL RESERVOIRS Sub-Master Docket No.
17-cv-9001L

5
6 Judge Charles F. Lettow

7 THIS DOCUMENT RELATES TO:
8 ALL UPSTREAM CASES
9

10 ORAL DEPOSITION OF VAL ALDRED
11 AUGUST 1, 2018
12
13

14 ORAL DEPOSITION OF VAL ALDRED, produced as a
15 witness at the instance of the Defendant and duly
16 sworn, was taken in the above styled and numbered
17 cause on Wednesday, August 1, 2018, from 8:58 a.m.
18 to 3:31 p.m., before Rene White Moarefi, CSR, CRR,
19 RPR in and for the State of Texas, reported by
20 computerized stenotype machine, at the offices of
21 Potts Law Firm, 3737 Buffalo Speedway, Suite 1900,
22 Houston, Texas, pursuant to the Federal Rules of
23 Civil Procedure and any provisions stated on the
24 record herein.
25

<p style="text-align: right;">Page 62</p> <p>1 Q. So you spent two nights away from your 2 home, then?</p> <p>3 A. That's -- well, before I came back on the 4 31st, yes.</p> <p>5 Q. Okay. And how long did you stay at your 6 home on the 31st?</p> <p>7 A. Well, we -- we went in, saw that the 8 water was still standing in the -- in the house, 9 took pictures, tried to put some furniture on -- in 10 cups and things like that so it wouldn't be standing 11 in water and -- not much we could do.</p> <p>12 Q. How much water did you see?</p> <p>13 A. At the time, probably about a foot. And 14 that's because it had receded, more than likely.</p> <p>15 Q. How much water do you estimate that you 16 received in total?</p> <p>17 A. About a foot and a half.</p> <p>18 Q. Okay. And what's that estimate based on?</p> <p>19 A. Based on the water lines that were on the 20 studs.</p> <p>21 Q. And was that water level uniform 22 throughout the house?</p> <p>23 A. I think so.</p> <p>24 Q. Did -- did you notice that one portion of 25 your home received more water than another portion?</p>	<p style="text-align: right;">Page 64</p> <p>1 furniture into paper cups. Did you take any other 2 steps at that time to try to save any of your 3 belongings?</p> <p>4 A. No. I mean, that was about all we could 5 do at the time. Everything -- everything we had 6 done before we evacuated was done, and it was all we 7 could do at the time.</p> <p>8 Q. Okay. Do you recall when you left your 9 home on the 31st?</p> <p>10 A. A couple hours later.</p> <p>11 Q. Okay. And during that time, had the 12 water level changed at all?</p> <p>13 A. I -- I don't know.</p> <p>14 Q. Okay. Do you recall when you next 15 returned to your home?</p> <p>16 A. It was a Saturday, the -- September 17 the 2nd.</p> <p>18 Q. Okay. And when you returned to your 19 home, what did you see?</p> <p>20 A. It -- it wasn't as much water. It -- to 21 that point, we could begin and did muck out all the 22 walls, tear down the walls, take out the sheetrock, 23 squeegee out whatever water we could that was near 24 the door.</p> <p>25 Q. So do you have an estimate as to how much</p>
<p style="text-align: right;">Page 63</p> <p>1 A. No, I don't recall.</p> <p>2 Q. Okay. You mentioned earlier, I believe, 3 that the home sloped downward the further north you 4 went. Did the north side of your home, which is, I 5 believe, the right side of your home, get more 6 water?</p> <p>7 A. You know, there was a lot of water that 8 day. I just don't remember. I mean, I didn't take 9 the time to measure it.</p> <p>10 Q. So when you came to your home on the 31st 11 around midmorning, can you just walk me through what 12 you saw?</p> <p>13 A. Yeah. I saw our street was still 14 flooded. We had to park on the street on 15 Thornbranch, which is the street east of ours. And 16 we parked as far as we could -- you know, as close 17 as we could and then walked around the -- the corner 18 and then crossed our street to the house.</p> <p>19 Oh, and then from there, we went inside 20 and saw all the water that was standing there and 21 just, you know, were, I guess, unhappy about it. We 22 were sad. It was -- took some pictures and, you 23 know, tried to -- tried to organize or get our -- 24 collect our thoughts as best we could.</p> <p>25 Q. Okay. You mentioned that you put some</p>	<p style="text-align: right;">Page 65</p> <p>1 standing water there was at that time on the 2nd?</p> <p>2 A. No, I don't.</p> <p>3 Q. Okay.</p> <p>4 A. I don't. I just -- no.</p> <p>5 Q. Okay. Were you able to squeegee out the 6 water?</p> <p>7 A. I know that I didn't. My wife may have 8 had a broom and tried to push some of it out.</p> <p>9 Q. Okay. Did your wife accompany you on 10 both trips?</p> <p>11 A. Yes.</p> <p>12 Q. Did anyone else accompany you?</p> <p>13 A. Let's see. My daughter who -- Casey came 14 with me on the first trip. I don't remember if she 15 was with me on the second trip. And then the 16 daughter I was living with accompanied me on the 17 second trip. I just -- there were people coming and 18 going, honestly.</p> <p>19 Q. Right.</p> <p>20 A. I don't remember who was who or when and 21 where.</p> <p>22 Q. Did you personally rip out the sheetrock 23 and the insulation?</p> <p>24 A. I did a little bit, yes.</p> <p>25 Q. And your family did as well?</p>

DEPOSITION OF JANA CANAN BEYOGLU

DEPOSITION AND ANSWERS of JANA CANAN BEYOGLU, taken before Edith A. Boggs, a certified shorthand reporter in Harris County for the State of Texas, taken at the law offices of Neel, Hooper & Banes, PC, 1800 West Loop South, Suite 1750, Houston, Texas, on the 18th day of September, 2018, between the hours of 1:49 p.m. and 5:06 p.m.

1 17th.

2 Q. The 16th or the 17th?

3 A. Either one of those days. I can find it if I
4 go into the -- my miles card when I returned. I can
5 kind exact date later if you need it. Yeah.

6 Q. And so, you talked about being in communication
7 with your friend while you were in Turkey?

8 A. Uh-huh.

9 Q. How did you communicate with her?

10 A. WhatsApp.

11 Q. WhatsApp?

12 A. (Witness indicated by nodding her head
13 affirmatively.)

14 Q. Okay. Do you still have those records?

15 A. I do.

16 Q. So, what were you communicating about while you
17 were in Turkey?

18 A. If the water is still in the house or not. And
19 actually, I believe she took several pictures around
20 this time that water was still in the house somewhere
21 around here, that high, and then it start going down
22 later after 5th or 6th.

23 Q. After the 5th or 6th?

24 A. Uh-huh.

25 Q. And is this the friend that lived --

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO)
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 DANA CUTTS

9
 JUNE 27, 2018
10 -----

11
12 ORAL DEPOSITION OF DANA CUTTS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 27th day of June, 2018, from 9:07 a.m. to
16 2:55 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at the
18 offices of McGehee, Chang, Landgraf, 10370 Richmond
19 Avenue, Suite 1300, Houston, Texas 77042, pursuant to
20 the Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 A. I have no knowledge of that.

2 Q. Do you have any photographs of what occurred on
3 your property during the time when you were away?

4 A. No.

5 Q. Okay. And what date did you return to your
6 home?

7 A. Well, whatever eight days later. It says in
8 the -- do you have it?

9 Q. I think right underneath the map right in front
10 of you, I think that that's Exhibit 14.

11 A. Thursday, September 7th.

12 Q. Okay. Okay. Describe the process of coming
13 back to your home.

14 A. Parking a half a mile away. Sloshing through
15 all of our neighbors' yards up close to their houses
16 because there was standing water in the yards as well.
17 You could not walk on the sidewalk or the street. Their
18 lawns got pretty wrecked by all of the people. There
19 were emergency vehicles everywhere. People were still
20 being rescued from the back.

21 When we walked into our house, there was
22 still standing water in the floors that we mopped up.
23 That's -- that's it pretty much, yeah.

24 Q. Okay.

25 A. On that one day, that particular day.

IN THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE UPSTREAM ADDICKS §
AND BARKER (TEXAS) §
FLOOD-CONTROL RESERVOIRS § SUB-MASTER DOCKET

§ NO. 17-cv-9002L

____ §
§ Chief Judge Susan G. Braden

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

____ §

ORAL DEPOSITION

MR. JEREMY E. GOOD

July 19, 2018

ORAL DEPOSITION OF MR. JEREMY E. GOOD, produced
as a witness at the instance of the United States and
duly sworn, was taken in the above-styled and
numbered cause on the 19th day of July, 2018, from

a.m. to 12:23 p.m., before Michelle Hartman, 9:00
Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Raizner Slania, LLP, 2402 Dunlavy Street, Houston,
Texas 77006, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached hereto.

1 Q. Okay. Let me jump ahead just a little
2 bit. When was the first time that you were able to
3 get to the property?

4 A. September the 10th.

5 Q. And why were you -- why did it take so
6 long for you to get to the property?

7 A. That's when it was first accessible.
8 The flood waters had finally dissipated at that point
9 and we were finally able to access it. And I
10 actually had to park my car a mile away and walk in.
11 They weren't allowing cars at that point.

12 And if you see, too, I believe on one
13 of these things, (indicates) it indicates that I was
14 trying to get up there. Let me see here.

15 For example, on page -- this is my
16 page nine. On Thursday, August 31st, I had told
17 them, "I'm attempting to go again this afternoon.
18 Another contractor I use tried to get in but the
19 roads seem bad. Keep you posted."

20 So I was trying almost on a daily
21 basis to get up there. Again, I would look at the
22 maps and say, well, I know this is closed, they are
23 probably just letting locals through. Again, I had
24 no idea the extent of what was truly happening.

25 Q. And let me just confirm: This text

1 string -- and this document contains a text string.
2 It is a single text string between the three people
3 that you have identified?

4 A. Correct.

5 Q. Okay. When you go there on
6 September 10th, could you describe for me what you
7 saw as far as water level.

8 A. I arrived on the property on the
9 evening of Sunday, September 10th, I would say
10 approximately 8:00 o'clock. It was after a function
11 I had just played for. I had to very carefully walk
12 through the mud at that point. It was -- it was hard
13 to find solid surfaces.

14 The water at that point had dissipated
15 to puddles. So I believe I was able to at least get
16 to the outside of the building that evening, but
17 there were still again standing water in some places
18 and complete mud and impassable sections in others.

19 Q. But there was no longer a constant
20 inundation between the stream and the units?

21 A. That's correct.

22 Q. What is your understanding as to when
23 flood waters were no longer present in the unit
24 itself? And I don't mean by the time the building
25 dried out, I mean Monday --

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 WAYNE HOLLIS
10 JULY 19, 2018
11 -----

12 ORAL DEPOSITION OF WAYNE HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 8:59 a.m. to
16 12:13 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.

<p style="text-align: right;">Page 50</p> <p>1 A. Only clothes and stuff we got out of the water 2 in the lower hangers downstairs. The furniture was all 3 already under water. Everything was ruined downstairs. 4 Q. And about how long did you stay at the house on 5 the 29th? 6 A. Probably an hour, hour and a half. 7 Q. And did you have neighbors who were still 8 trying to stay in their homes? 9 A. Trying to salvage medicines and things like 10 that. 11 No. Everybody had evacuated by then. 12 Q. And were you able to salvage some medicines to 13 bring -- 14 A. Some -- 15 Q. -- back? 16 A. Some medicines, some clothes. 17 THE REPORTER: Will you just try to wait 18 until she finishes, please? 19 THE WITNESS: Okay. 20 Q. (BY MS. TARDIFF) And so on -- on the 30th, 21 which is Wednesday, I believe. Yes. So the 29th was 22 Tuesday. The 30th was Wednesday. About what time did 23 you return by boat on the 30th? 24 A. Around noon again, also. 25 Q. And again, what were your observations about</p>	<p style="text-align: right;">Page 52</p> <p>1 water had receded and they had closed the gates on the 2 dam. 3 Q. And when you returned on the -- on the 8th or 4 the 9th, who -- who returned with you on that day? 5 A. Peggy, my son, and about 20 volunteers. 6 Q. And I'm going to ask you to kind of describe 7 your observations. Do you need a break at any time? 8 A. Pardon me? 9 Q. Do you need a break before we kind of go 10 through that? 11 A. No. 12 Q. Okay. If you do at any time, just let me know. 13 Okay. So about -- and do you know whether 14 it's the 8th or 9th or just sometime -- 15 A. I would say the 9th. 16 Q. Okay. All right. I think I saw a note to that 17 effect, so that sounds right. 18 So when you returned on the 9th, do you 19 recall what time you returned? 20 A. Mid-morning. 21 Q. Okay. Was there -- was there any water still 22 in the streets? 23 A. No. 24 Q. Okay. How about any -- any water remaining in 25 your yard?</p>
<p style="text-align: right;">Page 51</p> <p>1 the water levels in the street at that time? 2 A. It had risen another 10 to 12 inches. 3 Q. And your estimate of it having risen another 10 4 to 12 inches, were you looking at mailboxes? windows? 5 What were you looking at to kind of gauge the level? 6 A. Mailboxes, street signs. 7 Q. Okay. And again, can you describe for me, 8 you're able to get into your house again on the 30th? 9 A. Yes. 10 Q. And you had said the water was kind of above 11 your waist at that point. 12 A. Yes. 13 Q. So about how much higher was it in the house? 14 A. It reached a total of about 42 to 44 inches. 15 Q. Was it -- was it that high on the 30th? 16 A. Yes. I have a video of it. Y'all have a 17 record of it, and you can see. 18 Q. Yeah. Yeah. 19 And that's the highest that the water 20 reached in your house, as far as you know? 21 A. No. It would -- I feel it went higher, but we 22 never went back until... 23 Q. So after the 30th, when -- when was the next 24 time you were able to return? 25 A. September the 8th or 9th -- the 9th, when the</p>	<p style="text-align: right;">Page 53</p> <p>1 A. No. 2 Q. Okay. Was there any -- I understand your home 3 was certainly still wet inside, but was there any 4 standing water in your home or had it drained away? 5 A. Yes. There was sludge and water retained in 6 the home. 7 Q. And based on your observations in the home at 8 that time, you know, what's your estimate of -- as to 9 how high the water got in your home while you were away? 10 A. About 43 to 45 inches. 11 Q. And so the -- the water itself stayed on the 12 first floor. You didn't get any water on the second 13 floor aside from water that was brought up when you 14 moved? 15 A. Correct. 16 Q. Okay. Any -- any other rainwater getting into 17 the upper levels of your home through windows or the 18 roof or anything? 19 A. No. 20 Q. And did you actually start kind of salvage 21 operations in your home on the 9th in terms of removing 22 things? 23 A. Yes. 24 Q. And about how long -- how many -- was that a 25 period of days or weeks?</p>

<p style="text-align: right;">Page 62</p> <p>1 A. At that point.</p> <p>2 Q. At that point. Okay.</p> <p>3 Was -- was the water rising even while you</p> <p>4 were there on the 29th?</p> <p>5 A. Yes.</p> <p>6 Q. Okay. So about how much higher was it when --</p> <p>7 when you left on the 29th?</p> <p>8 A. It was probably another 10 to 12 inches.</p> <p>9 Q. And you reported to Ms. Wright that your wife's</p> <p>10 auto is also flooded in the driveway?</p> <p>11 A. Yes. And -- and my Yukon and my truck were</p> <p>12 flooded at the time, also. We couldn't get anything</p> <p>13 out.</p> <p>14 Q. So how many vehicles did you have in the</p> <p>15 driveway?</p> <p>16 A. Three. Actually, four. My neighbor brought</p> <p>17 his over.</p> <p>18 Q. Did he bring his over because your --</p> <p>19 A. Higher than he was.</p> <p>20 Q. You're higher. Okay.</p> <p>21 A. Across the street.</p> <p>22 THE REPORTER: Will you just try to wait</p> <p>23 until she finishes?</p> <p>24 THE WITNESS: I'm sorry.</p> <p>25 THE REPORTER: You're okay.</p>	<p style="text-align: right;">Page 64</p> <p>1 related to the FEMA relief.</p> <p>2 A. Yes. And we never got a response.</p> <p>3 Q. (BY MS. TARDIFF) And in terms of making the</p> <p>4 application, was that something you did or did your wife</p> <p>5 do it?</p> <p>6 A. Peggy did it.</p> <p>7 Q. Okay. And did your wife also take care of</p> <p>8 submitting the claim on flood insurance?</p> <p>9 A. Yes.</p> <p>10 Q. Did you have a flood insurance adjuster come</p> <p>11 out to your home at some point to inspect the property?</p> <p>12 A. Yes.</p> <p>13 Q. And did you meet with the adjuster?</p> <p>14 A. Yes.</p> <p>15 Q. Was it a man or a woman, do you recall?</p> <p>16 A. Both.</p> <p>17 Q. Both. Okay. All right.</p> <p>18 And can -- did you accompany them on their</p> <p>19 inspection of your home?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. And can you walk me through that</p> <p>22 inspection and what you -- or do you recall when the</p> <p>23 inspection was?</p> <p>24 A. The 9th or 10th. When we were cleaning out the</p> <p>25 house, they arrived and stayed with us for about a day.</p>
<p style="text-align: right;">Page 63</p> <p>1 (Exhibit 7 marked.)</p> <p>2 Q. (BY MS. TARDIFF) All right. Mr. Hollis, I've</p> <p>3 given you what we've marked as Hollis Deposition</p> <p>4 Exhibit 7. The Bates Number is Hollis 00782. This is a</p> <p>5 printout of an e-mail from you, again, to Lilla Wright</p> <p>6 at Allstate, Monday, September 4th, 2017, at 6:14 p.m.</p> <p>7 Do you recall this e-mail?</p> <p>8 A. Yes.</p> <p>9 Q. And it sounds like you had regular</p> <p>10 communications with Ms. Wright during this whole ordeal.</p> <p>11 A. Yes.</p> <p>12 Q. And at this point you're reporting to her that</p> <p>13 your home still has 22 inches of water in it?</p> <p>14 A. Correct.</p> <p>15 Q. But you had not been back since Saturday.</p> <p>16 A. Correct.</p> <p>17 Q. So how -- how did you know your home still had</p> <p>18 22 inches of water in it as of Monday?</p> <p>19 A. I don't recall. I think one of my neighbors</p> <p>20 went back in there and told us.</p> <p>21 Q. Now, once you evacuated and moved to your son's</p> <p>22 house, did you or your wife apply to FEMA for Hurricane</p> <p>23 Harvey-related relief?</p> <p>24 MR. HARTMAN: I'm just going to note for</p> <p>25 the record our objection to relevance for everything</p>	<p style="text-align: right;">Page 65</p> <p>1 Q. Okay. All right. And can you -- can you</p> <p>2 walk -- did you accompany them then on the inspection</p> <p>3 that day?</p> <p>4 A. Well, I showed them what it was. And then we</p> <p>5 were cleaning me out, and they continued to do what they</p> <p>6 measured and all that.</p> <p>7 Q. And did they have specific questions for you</p> <p>8 about -- about the damage they were tracking or</p> <p>9 documenting?</p> <p>10 A. They were looking at it.</p> <p>11 (Exhibit 8 marked.)</p> <p>12 MS. TARDIFF: I actually don't have an</p> <p>13 extra copy of this one. I apologize.</p> <p>14 Q. (BY MS. TARDIFF) What we've marked as Hollis</p> <p>15 Deposition Exhibit 8, the Bates is Hollis 00769.</p> <p>16 MS. TARDIFF: We can note, Counsel, a</p> <p>17 standing objection to questions about flood insurance.</p> <p>18 Q. (BY MS. TARDIFF) And, Mr. Hollis, do you</p> <p>19 recognize this document?</p> <p>20 A. Yes.</p> <p>21 Q. And can you tell me what it is?</p> <p>22 A. It's our flood insurance policy.</p> <p>23 Q. Okay.</p> <p>24 A. Proof of loss.</p> <p>25 Q. Proof of loss.</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
 ORAL DEPOSITION OF

8
 ARNOLD MILTON

9
 JULY 10, 2018
10 -----

11
12 ORAL DEPOSITION OF ARNOLD MILTON, produced as
13 a witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 10th day of July, 2018, from 9:02 a.m. to
16 2:48 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 When was the first time you returned to
2 your 850 Silvergate home?

3 A. The following Saturday. My son-in-law and I
4 went back in a boat with a pretty big outboard. And
5 like I say, when I turned into the front yard I fell off
6 the boat. And then he and I went into the house and the
7 water was up to here on me. And obviously it had been
8 higher based upon some of the stains on the wall. And
9 we wandered around the house and picked up whatever and
10 put it in plastic bags. I got my favorite boots, they
11 were floating solo up. And I use those to work in the
12 yard now.

13 But we took pictures. The refrigerator was
14 floating in the kitchen. The piano and a few other
15 pieces of furniture were under water in the living room.
16 And everything we put on tables was soaked,
17 unfortunately. We had stacked a lot of rugs and stuff
18 up there. And we had to have all -- all of that
19 cleaned. Stuff we could save, which was a couple of
20 pretty good-sized rugs, we had those cleaned. But we
21 stayed probably about 40 minutes and left.

22 Q. During that previous answer you said water was
23 about up to here and you pointed to your chest. Can you
24 estimate about how high that was?

25 A. However tall this is, I don't know. Whatever

1 what did the water in the home look like?

2 A. It was brownish, dirty looking.

3 Q. And how did it smell?

4 A. Bad. Smelled -- had a sewage tint to it.

5 Q. At that point was there any mold in your home?

6 A. You know, I don't remember the mold until we
7 got in there and started really stripping the walls
8 down. But I wasn't paying much attention to mold at
9 that time.

10 Q. What was the condition of the property upstairs
11 in your home on September 2nd?

12 A. Well, it was very humid. And the walls kind of
13 had lost their brightness. The carpet was kind of
14 grungy looking. But there wasn't much change other than
15 that. And without something to compare it to, it was
16 just a mental picture I had.

17 Q. Okay. After you left the house on the 2nd,
18 where did you go?

19 A. Well, we got in the boat. They came back and
20 picked us up and we went back to our son-in-law's house
21 and took what we had collected.

22 Q. When was the next time you returned to the
23 850 Silvergate home after September 2nd?

24 A. I'm pretty sure it was September the 10th. We
25 thought about going back on the 9th but we were --

1 because we were low on our block, there were already
2 people going into their homes on the 9th. But rather
3 than just go back and try to risk having the water down
4 enough to work, we went back on the 10th.

5 Q. And when you went back on the 10th, who was
6 with you?

7 A. My son-in-law. And I don't remember exactly
8 when his fraternity brothers and the crew came, but I
9 think it was mostly the next day. And the first thing
10 we had to do was pump out the living room. We had a
11 sunken living room, there's water still in it. So we
12 got one of these floor pumps and pumped that out. And I
13 believe there was power on when that happened.

14 And like I say, when they showed up they
15 were ready to go to work. They had already completely
16 stripped a couple of other homes for other friends, so
17 they knew exactly what they were doing. And they didn't
18 waste any time. And most of the time I was -- had a big
19 shovel, I was scooping up whatever they had stripped and
20 putting it in a wheelbarrow and wheeling it out front
21 and dumping it on the pile; that was basically my job.
22 Which was kind of a blessing because I didn't have to
23 see what they were doing to the house or my stuff. But
24 basically they just took it down.

25 Q. When --

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 VIRGINIA MILTON
10 JULY 10, 2018
11 -----

12 ORAL DEPOSITION OF VIRGINIA MILTON, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 10th day of July, 2018, from 3:14 p.m. to
16 5:00 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 government took your entire real property interest?

2 MR. HOBBS: Same objections.

3 A. Entire property would mean they took the whole
4 house and the land under it and all my goods. They did
5 destroy the whole lower floor to the -- and part of the
6 upper floor. Destroyed the land in the sense of all of
7 the yard and plants, so yes. And everything in it.
8 Some not replaceable.

9 Q. (BY MR. LEVINE) The -- your complaint alleges
10 that the government took both real property and personal
11 property permanently and temporarily. For the temporary
12 claim, are you alleging that the government took your
13 property for a particular period of time?

14 MR. HOBBS: Objection; form. And calls for
15 legal conclusions.

16 A. I don't know what you mean by "particular
17 period of time," unless it's the time that we're having
18 to be out of our house where -- while it's been
19 restored.

20 Q. (BY MR. LEVINE) Do you know what the
21 approximate duration the flood waters were in your home?

22 A. At least two weeks. From the time that the
23 flood -- the flooding stopped. It doesn't mean that it
24 couldn't have been in there more. But after the storm
25 had subsided, we couldn't go back into our home for two

THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE: DOWNSTREAM ADDICKS)
AND BARKER (TEXAS))
FLOOD-CONTROL RESERVOIRS)
) SUB-MASTER DOCKET NO.
) 17-CV-90021
)

ORAL DEPOSITION OF

JENNIFER SHIPOS

September 19, 2018

Volume 1

ORAL AND VIDEOTAPED DEPOSITION OF JENNIFER SHIPOS,
produced as a witness at the instance of the DEFENDANT,
was taken in the above-styled and numbered cause on
September 19, 2018 from 3:02 p.m. to 5:05 p.m., before
Toyloria Lanay Hunter, CSR in and for the State of
Texas, reported by machine shorthand, at the law offices
of NEEL, HOOPER & BANES, P.C., 1800 West Loop South,
Suite 1750, Houston, Texas 77027, pursuant to the
Federal Rules of Civil Procedure and the provisions
stated on the record or attached hereto.

1 photographs on the interior of your house.

2 A. Okay.

3 Q. The next photograph, 000230, what's portrayed
4 in that photograph?

5 A. This is my hallway. And I have an antique
6 hutch here in the entrance way.

7 Q. How deep was the water there, if you know?

8 A. I would say it's probably around at that time,
9 12 to 15 inches.

10 Q. Okay. And what do you base that on?

11 A. I think I just recall it being -- I think we
12 tried to mark all the watermarks on it.

13 Q. How long did it take the water to recede from
14 the interior of the house?

15 A. Six days.

16 Q. After the six days, do you remember seeing any
17 watermarks on the walls?

18 A. Yes.

19 Q. Was that all around the first floor?

20 A. Yes.

21 Q. And in the garage?

22 A. Yes.

23 Q. Did you have any watermarks in the exterior of
24 the house?

25 A. Yes.

1 --

2 MR. DOOHER: The fax sheet?

3 BY MR. BANES:

4 Q. Exhibit 11. Let's turn back to Exhibit 11,
5 ma'am. All right. Now, all right.

6 Now, you left -- when did you leave the
7 house, ma'am?

8 A. 10:00 a.m.

9 Q. 10:00 a.m. on what day?

10 A. On the 28th.

11 Q. 10:00 a.m. on the 28th?

12 A. Yes.

13 Q. All right. And do you know -- so where -- how
14 did you figure out that flood waters didn't come on the
15 property until the 29th?

16 A. Well, I told you, we walked to our neighbor's
17 house; which is, I don't know, about a mile to our
18 house. The next day we got up and we waded through the
19 water. And so at that point, it had water in the house.

20 Q. On the 29th?

21 A. On the 29th.

22 Q. And so now, had there been any water -- now,
23 at least when you left on the 29th, there was no water
24 in the house?

25 A. There was no water in the house.

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM)
ADDICKS AND BARKER) Sub-Master Docket
(TEXAS) FLOOD-CONTROL) No. 17-cv-9002L
RESERVOIRS)

ORAL DEPOSITION OF
TIMOTHY STAHL
SEPTEMBER 5, 2018

ORAL DEPOSITION of TIMOTHY STAHL, produced as a witness at the instance of the Defendant, and duly sworn, was taken in the above-styled and numbered cause on September 5, 2018, from 10:10 a.m. to 2:52 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of NEEL, HOOPER & BANES, P.C., 1800 West Loop South, Suite 1750, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

1 but above the air-conditioning unit.

2 Q. Okay. So where the deck is elevated, you
3 still have water underneath that deck at that time?

4 A. Yes, ma'am.

5 Q. Okay. And then how long did it take for the
6 water to recede past the end of your structure?

7 A. I don't remember. For all the water to go
8 back to being a creek, it was, like, a couple of
9 weeks. It was very slow on the drainage. It was -- I
10 think it was rapid at first and then it slowed down.

11 Q. All right. And were you visiting your
12 property daily at that point?

13 A. Only in the sense of opening it up to get the
14 air out and to try and get things moved out to the
15 curb that we knew we weren't going to keep and we were
16 sorting things, oh, yeah, we can wash that off, until
17 we found out about that E. coli thing, and then we
18 just tossed all of that, too. They're still calling
19 me specialist on here, too, but I haven't been a
20 specialist for 20 years.

21 Q. That must have been -- maybe that was the
22 first time you had insurance with them.

23 A. I've had insurance with USAA for 20 years.
24 Different sorts and credit card.

25 Q. When you -- when you -- let me rephrase that.

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE: DOWNSTREAM §

ADDICKS AND BARKER (TEXAS) §

FLOOD-CONTROL RESERVOIRS §

vs. § SUB-MASTER DOCKET NO.

§ 17-cv-9002L

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

§

ORAL DEPOSITION

MR. SHAWN S. WELLING

August 14, 2018

ORAL DEPOSITION OF MR. SHAWN S. WELLING,

produced as a witness at the instance of the United States and duly sworn, was taken in the above-styled and numbered cause on the 14th day of August, 2018, from 9:22 a.m. to 3:52 p.m., before Michelle Hartman, Certified Shorthand Reporter in and for the State of Texas and Registered Professional Reporter, reported by computerized stenotype machine at the offices of Potts Law Firm, 3737 Buffalo Speedway, Suite 1900, Houston, Texas 77098, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto.

<p style="text-align: right;">Page 226</p> <p>1 So I don't want pure guesses.</p> <p>2 Within the course of four days, would</p> <p>3 it have left your property?</p> <p>4 A. Since it first got there?</p> <p>5 Q. Yes. Would the flood waters had re --</p> <p>6 in four days after your last Facebook post, would</p> <p>7 the -- would the waters at least by that point have</p> <p>8 been entirely off your property, not counting the</p> <p>9 mess left behind?</p> <p>10 A. Oh, you're talking about the four days</p> <p>11 after I had my last post?</p> <p>12 Q. Yes.</p> <p>13 A. I think that is fair to say they would</p> <p>14 have gotten off my property. Maybe not off</p> <p>15 Brenner's.</p> <p>16 Q. Okay.</p> <p>17 A. It would still be on the parking lot.</p> <p>18 Q. But we are still -- and just so the</p> <p>19 record's clear, you just don't know as you sit here</p> <p>20 today whether it was three days, four days or five</p> <p>21 days, but it was something of that magnitude?</p> <p>22 A. Right. I mean, I have a couple of</p> <p>23 conclusions and theories, but I don't think this is</p> <p>24 the time and place for me to exploit that or talk</p> <p>25 about it, but I will just answer the questions.</p>	<p style="text-align: right;">Page 228</p> <p>1 that were dry or kept dry or to navigate water around</p> <p>2 areas that normally would have marshy, swampy Houston</p> <p>3 places that would not be able to be buildable. Maybe</p> <p>4 you're able to build here but then over here you</p> <p>5 can't.</p> <p>6 I know the demographics of my</p> <p>7 neighborhood and a few feet left, you can build; a</p> <p>8 few feet right, you can't. This allows you to do</p> <p>9 that, allows communities to grow and to prosper.</p> <p>10 Q. Did your brother Derrick's place flood?</p> <p>11 A. Judd's place that Derrick lived in,</p> <p>12 yes.</p> <p>13 Q. So Judd had two places?</p> <p>14 A. Judd has one place. He lives with --</p> <p>15 he allowed my brother to live there and he is staying</p> <p>16 with his girlfriend across the street.</p> <p>17 Q. Okay. So Judd's place where Derrick</p> <p>18 lived, did that flood?</p> <p>19 A. Yes.</p> <p>20 Q. And Judd's place or Judd's girlfriend's</p> <p>21 place where he was living, did that flood?</p> <p>22 A. No.</p> <p>23 Q. And what's that address?</p> <p>24 A. I have no idea.</p> <p>25 Q. Okay. Handing you what's been marked</p>
<p style="text-align: right;">Page 227</p> <p>1 Q. And you talked about this a little</p> <p>2 earlier, but I didn't really ask you, we didn't frame</p> <p>3 with it a question and answer: What was your</p> <p>4 historic understanding of the purposes of the Addicks</p> <p>5 and Barker dams and reservoirs?</p> <p>6 A. Not being an expert, it is my</p> <p>7 understanding that these reservoirs and -- these</p> <p>8 reservoirs and these dams prevent water from coming</p> <p>9 into areas that are developed in an uncontrolled</p> <p>10 manner; that the Army Corps of Engineers is allowed</p> <p>11 to control it; be it, as I had of thought when I was</p> <p>12 hearing the news, an example is this mass flooding,</p> <p>13 you're able -- instead of having the whole thing</p> <p>14 break, you let water out.</p> <p>15 Q. Let me interrupt you just so I frame it</p> <p>16 a little bit better. Because I might not have framed</p> <p>17 it well. I'm more interested in your historical</p> <p>18 understanding than what you learned either during or</p> <p>19 after Harvey.</p> <p>20 A. Yeah.</p> <p>21 Q. Prior to the Harvey event starting and</p> <p>22 historically when you acquired the property, did</p> <p>23 you -- were you aware of the dams?</p> <p>24 A. Yes. Yeah, they were an important part</p> <p>25 of us being able to build and be able to have places</p>	<p style="text-align: right;">Page 229</p> <p>1 Welling's Exhibit Number 5 -- give me a moment and</p> <p>2 let me get my own copy of it.</p> <p>3 This is Plaintiff's Objections and</p> <p>4 Responses to Defendant United States' Amended Second</p> <p>5 Set of Requests for the Production of Documents.</p> <p>6 Do you recall ever seeing this</p> <p>7 document before?</p> <p>8 A. I don't recall. I do not recall.</p> <p>9 This is the same document you handed</p> <p>10 me before?</p> <p>11 Q. It is not. It is a subsequent Request</p> <p>12 for Production of Documents.</p> <p>13 A. Okay.</p> <p>14 Q. And let me get -- on page four, request</p> <p>15 for production number 36, it says, "Text messages</p> <p>16 received or sent by plaintiffs relating to flooding</p> <p>17 on the test properties or flooding on properties</p> <p>18 within the same neighborhood of the test property</p> <p>19 during or after Hurricane Harvey."</p> <p>20 If you go -- there is an objection,</p> <p>21 and then if you go a few pages down to page eight,</p> <p>22 there is a Shawn Welling-specific response.</p> <p>23 A. Uh-huh.</p> <p>24 Q. Did you ever see that response before</p> <p>25 today?</p>

Val Aldred

August 1, 2018

Page 134

1 Q. Okay. Who plays piano in your house?
 2 A. Beg your pardon?
 3 Q. Who plays piano in your house?
 4 A. Gosh, well, everybody that used to's
 5 moved out now. My daughters used to. Not really
 6 anybody so much anymore.
 7 Q. Okay. What about the exercise equipment
 8 that we see? Were you able to save any of that?
 9 A. The object to the right, which is a --
 10 it's kind of like one of those StairMasters, ski
 11 things, that was damaged, so we weren't able to save
 12 it. The other one, we -- which is like one of these
 13 vibrating machines or something, it's -- yeah, we
 14 saved that.
 15 Q. Okay. Turning to Aldred 214, do you know
 16 when this picture was taken?
 17 A. Not exactly, no.
 18 Q. Can you describe what we're looking at
 19 here?
 20 A. You're in the laundry room looking at --
 21 I mean, on the left-hand side would be the hot water
 22 tank or closet, and that's the wall between the
 23 laundry room and the kitchen.
 24 Q. Okay. Other than removing the sheetrock
 25 and the insulation, did you do any other repairs to

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1 this area?
 2 A. No, we had a -- we have to replace some
 3 of the tile that's chipped down below where the --
 4 where the base of that -- those studs are.
 5 Q. How did the tile get chipped?
 6 A. When we -- when we mucked and gutted all
 7 the trim and the sheetrock.
 8 Q. When you say you mucked and gutted, what
 9 does that mean?
 10 A. Demolition.
 11 Q. Okay. Turning to Aldred 216, do you know
 12 when this picture was taken?
 13 A. Not exactly, but I would surmise sometime
 14 Saturday when volunteers showed up to help.
 15 Q. Okay. Do you know where --
 16 A. That's --
 17 Q. -- this picture was taken?
 18 A. Yeah, that's the hall looking toward the
 19 master bedroom from the foyer.
 20 Q. So throughout your entire first floor,
 21 did you remove the sheetrock and the insulation?
 22 A. Where there was insulation. In this
 23 particular picture, there was no insulation, because
 24 it's between common walls in the interior part of
 25 the house.

Page 136

1 Q. Okay. And did you -- did you remove
 2 generally a uniform amount of sheetrock?
 3 A. We removed whatever it is my volunteers
 4 removed. They just -- some of them were a little --
 5 kind of little carried away in some areas, but we
 6 were going to have to replace most of this anyway.
 7 Q. Okay. Are you alleging that there was
 8 contaminated water or sewage on your property?
 9 A. I'm alleging that there was water on the
 10 property. I don't know whether it was contaminated
 11 or sewage.
 12 Q. Okay. Let's go through --
 13 (Exhibit 9 marked.)
 14 BY MS. IZFAR:
 15 Q. I'm going to show you a document that
 16 I've marked as Exhibit 9. It's a number of receipts
 17 that you've provided your attorney.
 18 Before we begin, do you have an estimate
 19 as to how much damage -- or how much it would cost
 20 to repair your home from the damage caused by the
 21 water entering your home?
 22 A. So far, it's a working document that
 23 still is updated, you know, day by day. But my best
 24 guess at this point is somewhere between 105- to
 25 \$115,000.

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1 Q. Okay. Do you have a spreadsheet
 2 documenting all the amounts that you spent?
 3 A. I do.
 4 Q. Have you provided that to your attorney?
 5 A. Yes, I think I have. Pretty sure I have.
 6 Q. Okay.
 7 MS. IZFAR: I'll send a follow-up
 8 correspondence, but we'll call for the production of
 9 that.
 10 BY MS. IZFAR:
 11 Q. So looking at Exhibit No. -- I guess it's
 12 9 -- what is this first invoice from Bill Talley?
 13 A. So Bill is my contractor that came in and
 14 basically procured and mounted all the sheetrock
 15 that we took -- took out of the house and then
 16 floated it and taped it in all -- every part of the
 17 house except for underneath the kitchen sink. Well,
 18 maybe he did that, too. Yeah, he did do it under
 19 the kitchen sink. Everywhere.
 20 Q. So you had a lot of friends and family
 21 and church members remove all the sheetrock
 22 initially, right?
 23 A. Uh-huh.
 24 Q. And did Bill Talley come in and replace
 25 all that sheetrock?

35 (Pages 134 - 137)

Phillip Azar

July 9, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 PHILLIP AZAR

9
 JULY 9, 2018
10 -----

11
12 ORAL DEPOSITION OF PHILLIP AZAR, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 9th day of July, 2018, from 9:02 a.m. to
16 5:03 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Kirby
18 Mansion, 2000 Smith Street, Suite 550, Houston, Texas
19 77002, pursuant to the Federal Rules of Civil Procedure
20 and the provisions stated on the record or attached
21 hereto; that the deposition shall be read and signed
22 before any notary public.

1 after Hurricane Harvey, the abatement people -- is that
2 what you call them? They came out. And they tore up
3 some drywall, you know, to get to the -- when they did
4 their abatement, I guess they dry it out or something.
5 That's where we found a lot of it. That's when we
6 discovered it.

7 Q. Did the abatement people give any indication
8 where that wood rot came from?

9 A. It may have been prior floods, roof problems.
10 I don't know. They didn't tell me. I've never talked
11 to anybody about that except my family when they put all
12 the buckets down to catch the water, towels.

13 Q. So besides your family and the abatement people
14 pointing it out, you've never discussed the wood rot
15 with anyone?

16 A. No, sir. I take it back. Anderson Windows
17 came out. I pointed it out to them. What my family
18 pointed out to me, what I just told you, I pointed out
19 to the window guy myself. I was out there with some
20 other people.

21 Q. Do you recall when you spoke to the folks from
22 Anderson Windows?

23 A. After Hurricane Harvey but I don't remember the
24 dates.

25 Q. Did the folks from Anderson Windows comment on

1 the wood rot at all?

2 A. I don't remember what he said. I'm sure he
3 did.

4 Q. Did he give any indication about how long it
5 might take for the windows to get into that condition?

6 A. I don't remember if he said -- if he told me
7 that.

8 Q. Do you have any idea how long it might have
9 taken for the windows to get in that condition?

10 A. I'm sure it wasn't just Hurricane Harvey. I'm
11 telling you that's when we discovered it, sir. Because
12 they came -- literally went up to the third floor and
13 took some drywall off. But some on the -- certainly on
14 the first floor, if there was any drywall, they took it
15 off so they could see what was in there and dry it out,
16 I guess they call it.

17 It certainly happened on the second floor.
18 And I believe they took some off the third floor, but
19 I'm not positive.

20 Q. Do you have cracks in your stucco exterior at
21 the home?

22 A. Now? Now?

23 Q. Presently.

24 A. Yes. In fact, we're working on the estimate on
25 that right now.

1 Q. Historically, throughout the time period that
2 you've owned the home, have you had problems with the
3 stucco cracking?

4 A. No, sir.

5 Q. Prior to Harvey, was there ever an instance
6 where you had cracked stucco?

7 A. I don't remember that, but I don't believe so.

8 Q. Do you regularly maintain the stucco?

9 A. I remember my brothers and we've hired people
10 to paint it. I don't believe we've done any stucco work
11 as far as fixing it or anything. But I believe we've
12 painted it a couple of times. You know, where they do
13 every year, they caulk it.

14 I'm literally not that close to the house,
15 you know, everyday stuff, repairs and stuff. My
16 brothers that live there did all of that.

17 Q. Did you say brother or brothers, plural?

18 A. Brothers.

19 Q. Which brother --

20 A. There are five boys and three sisters. The
21 other brothers would be Mike, who passed away; Mark; and
22 Jimmy. And Bobby, he did some work too.

23 Q. Would you say that your family members are the
24 ones regularly attending to the maintenance of the home?

25 A. Or we hired it out.

1 Q. In terms of paying attention to the details of
2 the maintenance, do your families pay more attention to
3 the maintenance of the Magnolia Bend home than you do?

4 A. Yes, sir.

5 Q. Prior to --

6 A. The reason I say that is because I was
7 surprised to see the rot. That didn't come from
8 Hurricane Harvey. That's been there for a while. But
9 we found it because of Hurricane Harvey, which is
10 probably a good thing.

11 Q. Prior to Hurricane Harvey, did you ever have
12 mold in the home?

13 A. I hope not.

14 Q. As a result of any prior flooding events, are
15 you aware of any mold in the home?

16 A. No, I'm not. I just -- every time that
17 something like that happens, we get the dryers and the
18 guys that do -- bring in dryers and dehumidifiers and
19 that kind of stuff.

20 Are you talking about, like, mold? Do you
21 see black mold and the dangerous stuff on the wall that
22 you see?

23 Q. I was asking about any sort of mold that could
24 form as a result of a water event.

25 A. I'm sure it forms. I just don't know. There's

1 or restrictive covenants there that run with the land
2 that are governed by the governments such as Hunter's
3 Creek, City of Hunter's Creek.

4 They also govern -- and I think I have some
5 documents in this area. They're the people that apply
6 the FEMA laws to the builders out here. So if someone
7 buys a house, they would believe that it's -- it's a
8 good house, it's not going to flood, it's not going to
9 have the zombie attacks. You know what I mean? You
10 know, it's got the restrictive covenants that the --
11 that's governed by the city, whatever city municipality
12 in that area, which is Hunter's Creek.

13 And I looked through all the paperwork. I
14 didn't see nothing in it. I saw there was some
15 variances as to walls and heights and floods and stuff,
16 but nothing like this, no.

17 Q. I'm sorry. When you say "variances," what do
18 you mean? You saw variances within the deed when you
19 purchased the home?

20 A. It wasn't on my property. It was on other
21 properties. I mean, I actually went through a whole
22 bunch of the stuff and I saw some variances. It was
23 dealing with the -- and I forget the name of the
24 property. But the guy on this -- what was his name?
25 The guy that built the house that was on top of that

1 appraisal, he had some variances.

2 David Young. I think he was called to a
3 board once or twice for variances. And what -- the only
4 variance that he had to do, as far as I'm concerned -- I
5 remember seeing this and I remember looking at it again
6 when you guys did the request for documents. There was
7 a variance that he had to waterproof the basement, you
8 know, kickout doors, all new dura rot, drywall,
9 reinforced concrete, stuff like that. And I remember
10 seeing a variance about a brick wall, but that was
11 down -- down Voss somewhere, someone else's property.

12 Q. Do you know why he needed to waterproof the
13 basement?

14 A. Yeah. Probably because it might be prone for
15 flooding. That's what I suspect.

16 Q. And when you say "basement," you're referring
17 to the first floor of your home?

18 A. Yes, sir. I'm sorry. Yes, sir.

19 Q. Are you alleging that the government took your
20 entire real property interest?

21 A. Yes.

22 Q. How?

23 A. Talk to them. I mean, it's unlivable.

24 Q. Do you think it's unlivable as a result of
25 government action?

1 A. Absolutely.

2 Q. But you do have family members still living in
3 it?

4 A. Yeah. They're just basically policing what we
5 got over there. I'm literally in the process of buying
6 a house right now. And get that bought and probably
7 take a lot of that stuff out of there, including them.

8 I just don't believe that house is
9 habitable anymore after this experience with Harvey and
10 with the release or whatever, both. I mean, I don't
11 think the releases would have happened but for Harvey,
12 but I don't think the house would have been damaged but
13 for the releases. And it was a taking. I'm not mad at
14 anybody, but it happened. I'm glad it -- you know, it
15 had to happen to somebody. And if it's me, then it's a
16 taking; but it helped, you know, other people.

17 Q. Your complaint alleges that the government took
18 your property permanently and temporarily. For the
19 temporary claim, are you alleging the government took
20 your property from a certain time period to another
21 certain time period?

22 A. Well, temporarily, we couldn't get in the
23 property at all. The property was taken when the
24 release happened. There was no doubt about it. The
25 water went straight up. We had to get the Coast Guard

1 to get them out of there. And later, the water
2 subsided. It went off the property, into the grass, but
3 not over the bank yet. And then it came back up. On a
4 sunny day, no rain, no clouds in the sky, the water came
5 back up again into the property, into the house.

6 We couldn't even get in there. And we
7 had -- and that's Ms. Stout, the first time she -- the
8 first time she came, she couldn't get in or maybe the
9 first two or three times. Because I was getting kind of
10 mad at her. I didn't care if you did get your feet wet,
11 I wanted to get somebody in here and start getting the
12 mold off there, if there is mold in there. I just
13 wanted it cleaned up and dried out.

14 Q. Are you alleging that the temporary taking was
15 from the time the water inundated your property to the
16 time that the water receded from the property?

17 A. But I believe it's one taking. It's a
18 permanent taking because that property will never be the
19 same again. Once you -- once you demolish something or
20 wreck something, it's never the same.

21 Q. So you don't think there's been a temporary
22 taking of your real property?

23 A. Well, sure there is.

24 MR. ROBERTS: Objection; misstates the
25 testimony.

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

THIS DOCUMENT RELATES TO:

DEPOSITION OF JANA CANAN BEYOGLU

9-18-18 HOUSTON, TEXAS



DEPOSITION OF JANA CANAN BEYOGLU

DEPOSITION AND ANSWERS of JANA CANAN BEYOGLU, taken before Edith A. Boggs, a certified shorthand reporter in Harris County for the State of Texas, taken at the law offices of Neel, Hooper & Banes, PC, 1800 West Loop South, Suite 1750, Houston, Texas, on the 18th day of September, 2018, between the hours of 1:49 p.m. and 5:06 p.m.

1 A. Two blocks down, and then I stayed with them,
2 that's the friend.

3 Q. And her house didn't flood?

4 A. No. No.

5 Q. Okay. And you said that you hired a contractor
6 to clean up the house?

7 A. Yeah. We had a contractor to dry the house and
8 cut the Sheetrocks and all the stuff. I think they
9 worked on this week and take everything out from the
10 house that it messed up.

11 Q. Okay. So, to your recollection, everything
12 that was on the first floor -- and based on the pictures
13 that we just saw, Exhibit 8, everything that was on the
14 first floor was destroyed by the flood?

15 A. Yes, pretty much.

16 Q. Okay.

17 A. Not the flood. Not the flood. I think we
18 could have -- if the water was in and out, we could have
19 saved a lot of stuff but then the water rised after that
20 and stayed for ten days. I think we lost almost
21 everything. Yeah.

22 Q. So, you think that if --

23 A. Not the flood.

24 Q. It was not the flood?

25 A. Because we have friends that they flooded but

1 the water went out immediately a few hours later, and
2 mine stayed ten days. I mean, if it was only for a few
3 hours, I'm sure I could have saved a bunch of stuff that
4 I couldn't.

5 Q. So, how long did you estimate that the water
6 stayed in your home?

7 A. At least probably ten days. At least ten days.

8 Q. What makes you think that?

9 A. Because the pictures and the contractors and
10 then actually even the insurance agent that came and
11 looked and the water was still around, so, he said he
12 would come back. I think he came back somewhere 11th.
13 He couldn't come back this week. He came back on the
14 11th, insurance agent, I believe.

15 Q. Okay. Well, we have that next as an exhibit.

16 A. Yeah.

17 Q. So, Exhibit 9, we have his report.

18 A. Uh-huh.

19 Q. And he was there -- if you look at the next
20 page -- September 6th.

21 A. Yeah, he came and -- did he do some work on
22 September 6th? Because I remember he couldn't do some
23 of them on September 6th. He couldn't do everything and
24 he came back again.

25 Q. When did he come back?

1 A. I wasn't in the town that time. So -- he came
2 several times after that.

3 Q. Do you know who made the claim -- the phone
4 call to call the insurance?

5 A. I did.

6 Q. You did?

7 A. I did.

8 Q. From -- no. You were still here?

9 A. I was still here.

10 Q. Because it says right here that it was done on
11 August 29th, 2017.

12 A. I was here.

13 Q. So, you were the one that called in?

14 A. Yes.

15 Q. And if you look right next to it, it says,
16 "Date of loss." Do you see that?

17 A. Yeah.

18 Q. It says, "August 26, 2017 at 1:00 a.m." Do you
19 see that?

20 A. That's not right. That's the time -- that's
21 like -- that's the lady drowning. Mine was in the
22 morning, the 27th. That's not right.

23 Q. So, you believe this is incorrect?

24 A. Yeah. The 26th, 1:00 a.m. is not correct.

25 Q. Where do you think he got that information

1 because we didn't want people -- when they come to see
2 the house, we didn't want them to step on it with their
3 shoes and stuff.

4 Q. Okay. So, what's this Andrean Thomson oil
5 painting?

6 A. That's one of the paintings that I purchased.
7 Where is that? It's -- it's oil paint.

8 Q. So, it's like a piece of art?

9 A. Piece of art, yes, oil paint.

10 Q. Do you agree with that value?

11 A. Where is it? I cannot see that one right now.

12 Q. 38.

13 A. Yeah, I guess. Probably it got higher, too.
14 It's been five years since we purchased it now. The
15 price might have got higher right now, but they didn't
16 put in depreciation on that one.

17 Q. Yeah, there's -- 53 they put a lot of
18 depreciation on. That was a Persian hand knotted rug.

19 A. Which that's not right. That should have --
20 probably it's more than 20 something now.

21 Q. It looks like they acknowledged it went up in
22 value or there was a tax or something and then they
23 depreciated it?

24 A. Yeah.

25 Q. You don't agree with that?

1 A. No, I don't, definitely.

2 You see my massage chair also? I'm sorry,
3 it was an antique but it was really important for me.
4 You know, it was very, very important for me.

5 Q. Well, just generally, you don't agree with the
6 valuations of the insurance --

7 A. No. No, because they did drop it a lot.

8 Q. All right. And you said your husband is
9 working on the diminution in value of the house with an
10 appraiser?

11 A. Yes, he is. Yes, he is.

12 Q. Ma'am, just one more question. If you had --
13 if the dams were not there, would your purchase decision
14 be different?

15 A. Yes, it would be different.

16 MR. BANES: Pass the witness.

17 FURTHER EXAMINATION

18 Q. (BY MS. SANTACRUZ) Okay. Just a couple
19 follow-up questions on that, and we're primarily going
20 to be focusing on this Exhibit 9, the claim adjuster
21 report. You mentioned something about the claim
22 adjuster measuring the level of how high the water came
23 in?

24 A. Well, because there were marks on the walls,
25 like inside and outside of the house. The water,

1 because it stayed, I guess, that long, it marked on the
2 Sheetrocks.

3 Q. Okay.

4 A. So, he measured it, I guess.

5 Q. He measured it, and you were there when he
6 measured it?

7 A. I wasn't. My husband but that's what he told
8 me, that that's how they came up with the four feet.

9 Q. So, according to you --

10 A. Our -- I'm sorry. Our contractor was with the
11 insurance company also. I'm remembering that because he
12 wanted to be there so he knows where to -- how far that
13 he can cut the Sheetrocks.

14 Q. So, your husband will know better than you what
15 was the amount if he was the one that met with the claim
16 insurance adjuster?

17 A. That's true.

18 Q. You mentioned that he included it in some
19 report. I don't see it in this report. Do you know
20 another report that he completed?

21 A. I really don't know. I don't know, but if
22 there is one, I'm sure our contractor has it because
23 that's how -- that's how they know, I guess, where to
24 shut the Sheetrocks and how far to go to the mold and
25 the humidities and wetness in the Sheetrock. So, I'm

Inga Godejord

September 17, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE DOWNSTREAM : Sub-Master Docket

3 ADDICKS AND BARKER : No. 17-cv-9002L

(TEXAS) FLOOD-CONTROL :

4 RESERVOIRS : Judge Susan G.

: Braden

5 :

THIS DOCUMENT RELATES :

6 TO: :

ALL TEST PROPERTIES :

7
8 * * *

9 MONDAY, SEPTEMBER 17, 2018

10 * * *

11
12 Oral deposition of INGA GODEJORD taken
13 at the law offices of Neel, Hooper & Banes,
14 P.C. 1800 West Loop South, Suite 1750,
15 Houston, Texas, commencing at 1:01 p.m.
16 before Debbie Leonard, Registered Diplomate
17 Reporter, Certified Realtime Reporter.

18
19
20
21
22
23 * * *

1 A. Yes, I do have.

2 Q. Do you know if you provided
3 them to your counsel yet?

4 A. I'm not sure.

5 MR. BANES: It's okay. We'll
6 follow up if we need to.

7 BY MS. HELD:

8 Q. So before Hurricane Harvey, did
9 you have flood insurance for the property?

10 A. Yes, we did. The first three
11 or four years after we bought the house.
12 Then we were told by our insurance broker
13 that we are in a 500-years floodplain, and we
14 actually do not need that, so then we
15 followed his advice.

16 Q. Do you recall the name of this
17 insurance broker?

18 A. No, not really.

19 Q. Do you recall what company he
20 was associated with?

21 A. No. Sorry.

22 Q. So before Hurricane Harvey, did
23 you believe that flooding on your property
24 and your house was a possibility?

25 A. No, not after I heard about

1 500-years floodplain.

2 Q. So after you returned to
3 Houston from Canada, when -- when did you
4 begin the cleanup of your house?

5 A. The day I entered the house.

6 Q. And that was September 11th or
7 12th?

8 A. 11th or 12th.

9 Q. And what type of tasks did you,
10 yourself, do in the cleaning up of your
11 property?

12 A. My task was to salvage the
13 things that was still in a good order or was
14 not damaged.

15 Q. Were there any -- was any of
16 your property on the second floor of the
17 house damaged? And when I mean "property," I
18 mean personal property, like clothing or
19 furniture, things like that?

20 A. No, no things on the second
21 floor.

22 Q. I would now like you to look at
23 Exhibit 4.

24 (Previously marked
25 Exhibit Godejord-4 was referred to the

1 witness.)

2 BY MS. HELD:

3 Q. And you recognize Exhibit 4?

4 A. Yes, I do.

5 Q. And what document is this,
6 would you identify it as?

7 A. It's a contract between us and
8 Stiffel Homes. It's a contract for his doing
9 our house, remodeling, renovation of the
10 house.

11 Q. And how did you come to hire
12 the Stiffel Homes as your remodeling company?

13 A. We went to --

14 Q. What made you choose them?

15 A. We looked at different
16 companies, and Stiffel was among them.
17 Actually, we trusted our next-door neighbors,
18 the Stackhouses. So after some
19 consideration, we choosed Stiffel Homes.

20 Q. So Stiffel Homes is the company
21 that's remodeling your neighbors' -- the
22 Stackhouses' home?

23 A. Yes, they do.

24 Q. And looking at paragraph
25 number 4. So what is the price of the

1 Q. -- or dam release. Excuse me.

2 And you haven't bought -- there
3 were a lot -- there was a lot of furniture
4 that's not listed here that you haven't
5 replaced yet, right?

6 A. We didn't replace, because we
7 are not in the house.

8 Q. Yeah. So when you move back in
9 the house, then -- then you're going to
10 replace the furniture; is that right?

11 A. And appliances.

12 Q. And appliances. And that's --
13 that's -- we don't have those yet?

14 A. Right.

15 Q. All right. And you haven't --
16 you haven't done -- you haven't done -- have
17 you done an estimate of the diminution in
18 value of the house yet because of the
19 flooding?

20 A. No.

21 Q. All right. But you're claiming
22 that too?

23 A. Yes.

24 Q. All right. And then -- oh.
25 Take a look back -- I want to ask you about

1 two documents at the same time, ma'am.

2 You've already got 5 in front
3 of you right there, so hold on to that. And
4 then right below it is 17. So I'm going to
5 ask you about those two.

6 Now, 5 is the -- was the
7 original estimate that you-all -- that was
8 used to get the loan for the house -- or for
9 the -- for the construction, right?

10 A. Right.

11 Q. All right. Now -- and you -- I
12 think you testified that the highlighted
13 parts are what you kind of reduced it down to
14 for the loan that absolutely needed to be
15 done?

16 A. Right.

17 Q. Now, the other things, there
18 were several things that you-all decided to
19 do yourself, right?

20 A. Yes.

21 Q. All right. Is that -- is that
22 among the things that aren't highlighted?

23 A. For example, plumbing fixtures.

24 Q. Yeah. So you still had to buy
25 plumbing fixtures, right?

1 A. Yes.

2 Q. And so just because it's not on
3 this list doesn't mean you didn't do it; it's
4 just you did it yourself or had purchased --
5 purchased it some other way?

6 A. Right.

7 Q. And those are either in the
8 receipts that we've got or we're going to get
9 those later?

10 A. Right.

11 Q. All right. Now -- now, in
12 Exhibit 5 and --

13 Now, Exhibit 5 is what was
14 ultimately used for Exhibit 12, I believe; is
15 that right?

16 A. What is 12?

17 Q. 12 is the closing on the loan.

18 A. Right.

19 Q. So turning to Exhibit 12, and
20 go to Bates stamp Godejord-89, ma'am. It's
21 that number at the bottom in the middle.

22 A. Uh-huh.

23 Q. All right. Now, there was
24 "Cash to Close." Do you see that amount
25 right there?

1 A. Yes. Yeah.

2 Q. So that was money that you-all
3 had to come up with in addition to everything
4 else to close on the loan, right?

5 A. Right.

6 Q. That 43,834.70?

7 A. Right.

8 Q. And then there's -- under
9 "Borrower's Transaction" there's several
10 numbers under there. What is -- do you know
11 what the -- what the -- what the "Home Point
12 Financial" is, what that is?

13 A. Yes, I do know.

14 Q. What -- what was that?

15 A. It was the -- our mortgage
16 company we paid our first mortgage to.

17 Q. All right. So this was a loan
18 that encompassed both the amount estimated by
19 the contractor and the mortgage and all
20 closing costs, right?

21 A. Right.

22 Q. All right. So what's the --
23 this 299,812, what -- what is that, on line 5
24 under "K"?

25 A. The -- I'm just reading what's

1 A. Or because he didn't check the
2 sewage line, which was full of the
3 floodwaters --

4 Q. Okay. So --

5 A. -- after they did that.

6 Q. There's one in here for the
7 sewage line, I believe. Oh, there it is.
8 It's at 2717, ma'am, in Exhibit -- in
9 Exhibit 17. It's at BANES 2717.

10 A. Uh-huh.

11 Q. All right. So you were saying
12 that when they first estimated the property
13 in Exhibit 5, they didn't see the problem
14 with the sewer lines?

15 A. No.

16 Q. What did they find when they
17 started looking at the -- at the lines?

18 A. They found out that there is
19 still floodwaters in our sewage line, and the
20 sewage line is damaged, so this is why we
21 decided to repair them, and these were the
22 additional costs came.

23 Q. So they found out --

24 A. And change order.

25 Q. All right.

1 A. Yeah.

2 Q. So they found out that the
3 sewer lines were damaged by the floodwaters?

4 A. And floodwaters were still in
5 there after the flood, after many months
6 after the flood. After the water were
7 gone -- was gone, the water in the sewage
8 line still was in there.

9 Q. Okay. Now, so that's just one
10 example, but were all the -- were all these
11 change orders additional things that the --
12 that the contract -- that Stiffel found when
13 they started doing the work?

14 A. Right.

15 Q. All right. And so they
16 wouldn't be included -- they were -- so
17 the -- the amounts in Exhibit 17 are in
18 addition to the amounts in Exhibit 5?

19 A. Right.

20 Q. Now, is there any examples in
21 Exhibit 17 where you're trying to take a
22 Toyota and turn it into a Lexus?

23 A. No.

24 Q. All right. So these are things
25 that -- in Exhibit 17, these are additional

1 things that needed to be done?

2 A. Right.

3 Q. Now, there was one example we
4 were talking about in Exhibit 8. I think we
5 were looking at the third page in Exhibit 8.

6 A. Yeah.

7 Q. Now, that was -- this was an
8 island that was built --

9 A. Right.

10 Q. -- during the renovation?

11 A. Right.

12 Q. Now, what was -- what was there
13 before?

14 A. There was a wall.

15 Q. Okay.

16 A. With a win- -- not window in it
17 but opening.

18 Q. All right. So there was a
19 window -- there was a wall with a -- with a
20 stove top and a window opening?

21 A. Yeah.

22 Q. All right. So it was just --
23 now, that wasn't a load-bearing wall, was it?

24 A. No.

25 Q. So instead of rebuilding the

Mr. Jeremy E. Good

July 19, 2018

Page 1

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE UPSTREAM ADDICKS §

AND BARKER (TEXAS) §

FLOOD-CONTROL RESERVOIRS § SUB-MASTER DOCKET

§ NO. 17-cv-9002L

§

§ Chief Judge Susan G. Braden

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

§

ORAL DEPOSITION

MR. JEREMY E. GOOD

July 19, 2018

ORAL DEPOSITION OF MR. JEREMY E. GOOD, produced
as a witness at the instance of the United States and
duly sworn, was taken in the above-styled and
numbered cause on the 19th day of July, 2018, from

a.m. to 12:23 p.m., before Michelle Hartman, 9:00
Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Raizner Slania, LLP, 2402 Dunlavy Street, Houston,
Texas 77006, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached hereto.

1 when we started corresponding again was the next day
2 at 10:51.

3 Q. I see what you're saying.

4 Do you have any photos of the property
5 while the property was inundated with water?

6 A. I do not have any personal photos.
7 There was one that was taken that we submitted by
8 boats of one of the neighbor's properties within ten
9 units of ours that was taken. I don't have any
10 actual photographs, though, myself.

11 Q. Okay. Yeah, I just don't remember
12 seeing any -- any photos. It may have been produced.
13 I just --

14 So other than that photo, are you --
15 you don't have any photos that reflect the property
16 while it was at -- while there were flood waters in
17 it?

18 A. I do not.

19 Q. Now, I think there is a rule here you
20 have produced these -- you have produced documents
21 reflecting texts and some e-mail communications.

22 A. Correct.

23 Q. Did your wife have any texts or any
24 e-mail communications with the tenants during this
25 period?

1 A. She did not. I am the primary
2 interface between the tenants and us.

3 MR. DAIN: Let's take a short break.

4 MR. MCGEHEE: Thank you.

5 (Recess taken)

6 (Exhibits 7 and 8 marked)

7 Q. (BY MR. DAIN) So I would just like to
8 get this kind of on the record. If you would just --
9 Good Exhibit Number 7 is a Google map identified as
10 760 Memorial Mews Street. In the middle of that map
11 is the little Google tag for 760 Memorial Mews
12 Street.

13 Does that accurately depict the area
14 and the location of the property here?

15 A. Yes.

16 Q. And there is Memorial Drive. How far
17 above Memorial Drive is the Addicks Dam?

18 A. I am not sure.

19 Q. Okay. A half mile? What is your best
20 estimate?

21 MR. WICKERT: Objection that it calls
22 for speculation.

23 THE WITNESS: I just don't know. It
24 is before 10, but I don't know.

25 Q. (BY MR. DAIN) Okay. Would you give me

1 a general description of the physical impact on the
2 property that you saw when you arrived on
3 September 10.

4 A. It is hard to really put it into words
5 what -- what that looked like when I showed up. Of
6 course it was at night, but I was able to go and I
7 believe I opened the doors at that point and stuck my
8 head in, and even though due to the extenuating
9 circumstances normally I won't enter the premises if
10 the tenant was not there, but I believe I did look in
11 and just do a brief view with my flashlight.

12 The bottom units was complete
13 devastation. That's really the general overview of
14 the condition of the units.

15 Q. Was there damage to the building other
16 than flood? Was there damage to any of the roof from
17 winds?

18 A. I didn't observe any at that point.

19 Q. Okay. At some point in time, did you
20 come to the conclusion that there had been damage to
21 the roof from winds?

22 A. I did have a roof contractor come out
23 and check the roof and it appeared to be okay.

24 Q. So I just saw some references in some
25 of the SBA documents that related to roof damage and

1 water accessing?

2 A. Right.

3 Q. What -- what was -- do you know what
4 I'm talking about?

5 A. I would have to go back and check what
6 that is. When I say the roof was okay, it was there
7 were no blatant holes or missing sections. And
8 again, I would having to go back and check the
9 records on what Mr. Whitman had done for me, but
10 other than securing up some minor leaks and some
11 other things like that, everything was,
12 quote/unquote, minor compared to what was going on
13 downstairs.

14 Q. But was the upstairs damaged because of
15 roof leaks, some damage?

16 A. I -- I can't speak to -- to what damage
17 was caused from what. I'm not certain.

18 Q. Did you ever measure high water marks
19 in the building?

20 A. We did.

21 Q. I have some photos here. I have all
22 the photos that were produced here.

23 A. Yes.

24 Q. I identified three that appeared to be
25 people with measuring tapes in their hand. So I

1 the side: So the face -- the bedrooms faced the
2 park. So if this is a north/south, east/west, we are
3 looking at it entering from the south side of things.

4 Q. Okay. Let's do this -- because that is
5 a fair point, I haven't tried to determine whether --
6 how it looks on the map -- if you would just -- if
7 you have a pen, if you would just make an "X" as to
8 the side of the building that faces the stream or
9 where the stream would -- what side the stream would
10 be in.

11 A. (Complies.)

12 Q. And so you've made an "X" on for Unit A
13 on the side that shows the bedrooms?

14 A. Correct.

15 Q. Okay. And so for Unit C, the parking
16 lot, would you just make an "X" as to where the
17 parking lot is.

18 A. The parking lot is here (Complies.)

19 Q. And you've made the parking lot
20 underneath the sun room?

21 A. That's correct.

22 Q. Okay. Thank you. So just to get that
23 right, would it be correct that the kitchen and
24 dining room of Unit C shares a wall with the bathroom
25 and bedroom of Unit A?

1 A. The kitchens are back to back.

2 Q. The kitchens?

3 A. The kitchen's actually -- and the
4 dining room is back to back. So it is as if -- if
5 you turn Unit A, it is hard -- if you turn Unit A
6 90 degrees counterclockwise and -- and put it back to
7 back, you would have the correct outlay.

8 Q. Okay. Now, I want to talk about the
9 repairs that were done and the costs that were
10 incurred.

11 And there's been a lot of documents
12 provided on -- and I am going to try to figure out to
13 berths way to do this efficiently.

14 A. Great.

15 Q. But it will take some time to maybe
16 work through it all.

17 A. Okay.

18 Q. Let me just start generally: What,
19 from your perspective, were the total costs you
20 incurred in repairing the damage that came from the
21 flood?

22 A. Up to this point, which is -- which is
23 July of 2018, we had incurred approximately -- and I
24 had the exact number somewhere in these documents,
25 but approximately \$80,000.

1 Q. And is -- that \$80,000 number, does
2 that exclude the lost rent or include the lost rent?

3 A. That does not include lost rent.
4 That's simply materials that was -- that were
5 utilized.

6 MR. DAIN: Let's go off the record for
7 a second.

8 THE WITNESS: Sure.

9 (Recess taken)

10 (Exhibit 10 marked)

11 Q. (BY MR. DAIN) Handing you what's been
12 marked Exhibit 10.

13 Is that the colored version of the
14 same three photos that we were talking about a little
15 while ago?

16 A. Yes, it is.

17 Q. And if you look at the last color --
18 the last page of that exhibit, do you have a better
19 ability at this point to identify what the height
20 water mark is as shown in that photo?

21 A. As shown in this photo, it appears that
22 we are -- that we are somewhere in the 30 range. I
23 can't exactly tell. The mud is at a bit of an angle
24 here, but I would say somewhere in the 30s nearly,
25 not up to the 41-inch mark.

1 Q. All right. So I will just do this one
2 more time before we go on the record.

3 (Discussion off record)

4 Q. (BY MR. DAIN) All right. So we have
5 had this discussion about the most efficient way to
6 go forward, and you have talked about costs up
7 through July.

8 All right. Well, before we turn to
9 the documents then, let me just ask this: You say
10 costs incurred up through July 2018.

11 Is there repairs that still needed to
12 be made?

13 A. We don't know is the short answer.
14 Things that were compromised or may have been
15 compromised that were still working we kept in place
16 to help mitigate costs at the current time or at the
17 current time of repairs.

18 Additionally, I'm seeing new cracks on
19 the outside that I had Stretch Construction come back
20 and look at and, you know, things like that. We
21 don't know if that is a long-term effect. We don't
22 know the full extension of the repairs.

23 Q. So you estimate those -- you estimate
24 the costs to date to be approximately \$80,000?

25 A. Correct.

1 Q. How were -- how did you keep the books
2 and records associated with these costs?

3 A. My wife kept the receipts and the costs
4 in a notebook so that everything was -- that
5 everything that was spent, whether it be on materials
6 or contractors, was kept.

7 Q. And were those handwritten notations?

8 A. Yes. Except, of course, for the
9 receipts that were presented from the various --

10 Q. Understood. But your wife's
11 bookkeeping --

12 A. Yes --

13 Q. -- was --

14 A. -- handwritten.

15 Q. -- handwritten?

16 A. Yes.

17 Q. So I'm just going to start handing you
18 some documents and we're going to start talking about
19 how to understand the component parts of this
20 \$80,000, all right?

21 A. You bet.

22 Q. Let me ask this: Were the costs ever
23 broken out by units, Unit A, Unit C, Unit B, Unit D?

24 A. I don't recall if every cost was broken
25 down in that manner. Certainly some of the bigger

1 items. For example, the AC unit in Unit D would have
2 been itemized on the HVAC receipt. So there will be
3 some indications of some of the specific units, but
4 in most cases, probably not.

5 Q. Okay. Well, just as we are about to
6 start the next question, let's put it in the same
7 place.

8 State again which units are downstairs
9 and which units are upstairs.

10 A. Unit A and Unit C are the downstairs
11 units. Unit B and Unit D are the upstairs units.

12 Q. Do you believe that there was damage
13 caused from the flooding to either B or D?

14 MR. WICKERT: Objection: Form to the
15 question.

16 THE WITNESS: I don't know.

17 Q. (BY MR. DAIN) Did you undertake repairs
18 at B and D that are a part of the \$80,000 figure you
19 gave me?

20 A. Yes.

21 Q. What repairs were done to B -- well,
22 how about: Were they done to B or D or both?

23 A. I would have to go back to see
24 specifically what was done, but I know off the top of
25 my head the air conditioning unit in Unit D was fully

1 replaced.

2 Q. And was the air conditioning unit for
3 Unit D on ground level?

4 A. Yes.

5 Q. Anything else on Unit D that was
6 repaired?

7 A. Based on my memory, no; but again, I
8 would have to refer back to our records.

9 Q. As you sit here today, do you recall
10 any water discharge in the upstairs units?

11 A. No.

12 Q. And as you sit here today, do you
13 recall any damage to Unit B from the flood waters?

14 A. No.

15 Q. And as you sit here today, is it your
16 recollection that the --

17 A. I may amend that. Potentially the
18 staircase leading up to B, which was sitting on the
19 ground level, may have been impacted. We did have
20 repairs done on that.

21 Q. And that would be the staircase at the
22 ground level?

23 A. Correct.

24 Q. And other than the air conditioning
25 unit for Unit D, as you sit here today, can you

1 recall any other damage that was done to Unit D from
2 the flood waters?

3 A. No.

4 MR. DAIN: Okay. Give me one second.
5 We will go off the record and I will try to get some
6 of the handwritten documents in front of you.

7 THE WITNESS: You got it.

8 MR. DAIN: We are going to go back on
9 the record for one thing, just to take care of
10 something I want to do that should help the rest of
11 the conversation.

12 Q. (BY MR. DAIN) If you would, look at
13 the Amended Initial Disclosures. I believe it is
14 Exhibit 1 or 2.

15 A. Uh-huh.

16 Q. Before we start the next discussion, it
17 might just be helpful to kind of identify some of the
18 players here.

19 A. Sure.

20 Q. And so you identified certain entities
21 that have knowledge of the extent of flooding.

22 A. Yes.

23 Q. I'm just going to walk you through
24 these and ask you as to each one the nature of the
25 work they did.

1 A. Yes.

2 Q. So the first is Stretch Construction --

3 A. Yes.

4 Q. -- what was the nature of the work they
5 did?

6 A. They came in around the drywall phase
7 and helped get us to about 90 percent completion,
8 whether it was drywall or -- and again, I would have
9 to look back and see, but they did most of the
10 bathrooms and the kitchen work.

11 Q. Like the kitchen replacement or just
12 wall work or what?

13 A. Wall work, floor work. And that's
14 been -- again, these -- I essentially was the general
15 contractor for this project. And so each player did
16 a little bit of -- a little bit of everything, so to
17 speak. And we can go through and look at a Stretch
18 itemization on that.

19 Q. That's fine. That was helpful. Thank
20 you.

21 A. Yeah.

22 Q. The second entity is Abner Cabrialess --

23 A. Yes.

24 Q. -- and then it says CAB Home
25 Renovations.

1 have they done?

2 A. That's what I believe they did to the
3 extent that I can remember and if my memory serves on
4 that, but that's my understanding.

5 Q. That's fine.

6 Second Chance Water Restoration, what
7 work did Second Chance Water Restoration do?

8 A. They came and did mold remediation work
9 for us. Once we had mucked out the unit, which we
10 had completely cleaned it out and cleared it out,
11 they came in and took care of all the mold and made
12 sure that the unit was safe for beginning to rebuild.

13 Q. And A-American Pest Control --

14 A. Uh-huh.

15 Q. -- what work did they do?

16 A. They came in and sprayed for the
17 termites. After we had gotten all of the mediation
18 done, we wanted to do a preventative spraying for
19 termites.

20 Q. Okay. That concludes the folks that
21 are identified as contractors in your Amended Initial
22 Disclosures.

23 As you sit here today, can you think
24 of any other contractors that performed any work out
25 there?

1 A. We had, again, various friends and
2 family that came in that helped us on multiple
3 levels. I would say the only other one that was a
4 significant help would be a gentleman by the name of
5 Paul Hoarst (ph). He was a friend that helped with a
6 good bit of the drywall. He was a former contractor
7 and was able to help with that.

8 But other than that, we had church
9 folk come out and rip stuff out and carry stuff off,
10 so that was a big help.

11 MR. DAIN: Okay. Let's take a
12 little -- take a little break and I will get some
13 documents in front of you.

14 MR. WICKERT: Okay. We can use the
15 restroom.

16 (Recess taken)

17 (Exhibits 11 and 12 marked)

18 Q. (BY MR. DAIN) Handing you what's been
19 marked Good Exhibit Number 11 and then Good Exhibit
20 Number 12. They both start with some handwritten
21 summaries. For one second just take a quick review
22 of those. Here is 11.

23 MR. DAIN: And one for you. Sorry, I
24 just keep just --

25 Q. (BY MR. DAIN) So these are the

1 documents I believe as they were produced to us.

2 And 11 -- Exhibit 11 is

3 GoodResourcesLLC 109 and the last page is

4 GoodResourcesLLC 119. Do you see that?

5 A. Yes.

6 Q. Okay. What is this document?

7 A. This is a -- this is a record of all of
8 the receipts and costs that we incurred or were going
9 to come up.

10 Q. Okay. Now, let's go ahead in order to
11 make that -- so do we need to look at 11 and 12
12 together?

13 A. I'm not sure if I understand your
14 question.

15 Q. I'm just trying -- so let's just say,
16 you know, Exhibit Number 12 is GoodResourcesLLC
17 Document 120 and then Document 155, correct?

18 A. Yes.

19 Q. What is Exhibit Number 12?

20 A. I believe it is a continuation of
21 Exhibit Number 11, so I would go through -- and my
22 guess as we look at some of the dates, I believe this
23 is a chronological --

24 Q. Which one's chronological?

25 A. I believe 11 is before 12. Again, I

1 would have to verify these dates on the receipts. It
2 looks like the first date on page 110 is from Home
3 Depot on September the 4th of '17, including some
4 masks that were purchased to not breathe in the air
5 up there.

6 Academy, the next one over, the same
7 day, would have been for some boots that I bought and
8 then some bug spray. And so it looks like it starts
9 from there. And the next one -- and again, I am
10 interpreting how my wife would have kept these.

11 The next one is for Lowe's on
12 September the 4th as well and so forth.

13 So it looks to be a chronological --
14 let's go check. 119, the date on that is
15 October 2nd. It looks to be -- I am seeing now
16 looking over at Document Number 12 that starts on
17 September 3rd, so that would not be consistent with
18 what my initial theory was.

19 It appears to be -- most likely my
20 guess is that as I received receipts and/or as we
21 printed things, I gave them to Anna. For example, I
22 can explain what happened here on --

23 Q. Are we in Exhibit --

24 A. 12.

25 Q. -- 12.

1 A. And Exhibit 12, we at that point
2 surmised that we were going to have a total loss with
3 all the flooding. At that point we understood that
4 everything was underwater. We had gone out and taken
5 advantage of a promotion at Lowe's for the kitchen.
6 It looks like we bought kitchen appliances at that
7 point and then they were paid for at a later point
8 when they were actually shipped. So that's why that
9 would be at that date.

10 So a lot of the things that were
11 purchased, my wife was quick to jump on any deals
12 that we could find and knowing what was going to be
13 coming down the road.

14 Q. And so the first pages of 11 and 12, do
15 you recognize those as a spiral notebook as to how
16 your wife kept these records?

17 A. Yes. And as a matter of fact, I can
18 explain further to give some more clarity.

19 The numbers with the boxes on both of
20 those pages would indicate what page number in her
21 notebook that coincided with.

22 Q. So there is kind of a schedule that
23 underlies this?

24 A. In trying to understand exactly what
25 she did, for example, if I go to on Document 11 --

1 Q. Yes.

2 A. -- if I go down to "mold remediation,"
3 which is near the bottom of the left-hand list,
4 "mold," M-E-R, and then in parentheses number two for
5 \$1,800.

6 Q. Yeah.

7 A. There is a number 11 next to that. And
8 if we go over to box 11 on this page, you'll see the
9 receipt for that on page 11, which is 115 of Document
10 11.

11 Q. Okay. That's helpful. Thank you.

12 So you would think the cover page is
13 all summary of everything else attached?

14 A. It appears to be that.

15 Q. Okay. And without double-checking
16 every entry, that would be your understanding of
17 Exhibit 12 as well?

18 A. Correct. We could spot-check
19 certainly, but that's my understanding.

20 Q. Prior to -- well, after you purchased
21 the property in January of 2015 -- correct?

22 A. Correct.

23 Q. -- did you perform any upgrades to any
24 of the units, carpet, kitchen, any significant
25 upgrades?

1 A. We would have replaced the flooring in
2 Unit C and the flooring in Unit A.

3 Q. And this is before the flood?

4 A. This is before -- yes, before the
5 flood. And I don't have the specific dates in memory
6 when we did that. We would have repainted when
7 tenants moved out. There may have been one or two
8 turnovers in that time period.

9 We also replaced the air conditioning
10 unit in Unit A months prior to, just a couple of
11 months prior to the flood. And those are some of
12 just the upgrades off the top of my head that I can
13 recall at this time.

14 Q. And were the conditions of the units
15 relatively the same: Was -- were the age of the
16 kitchens relatively the same, were the carpeting of
17 the units relatively the same in the four units?

18 A. Relative to each other?

19 Q. Relative to each other.

20 A. I believe, yeah, they were all
21 updated -- yes, I think they were updated three or
22 four years prior to our purchase. So I would say
23 around 2011, 2012 that they were upgraded.

24 Q. Upgraded or updated in what way?

25 A. New cabinetry, new appliances. And

1 those just the first half of the year and second half
2 of the year?

3 A. In doing some quick math, that would be
4 my guess. I don't know what that formula is but that
5 would be a guess, yeah.

6 Q. Turning to Exhibit 14. What is
7 Exhibit 14?

8 A. Exhibit 14 is the 2017 Memorial Mews
9 rental income expense worksheet.

10 Q. The same columns and rows as far as
11 structural organization; is that correct?

12 A. Yes.

13 Q. And this is a document you maintained?

14 A. Yes.

15 Q. Well, we talked about trying to find
16 identification of a summary of the expenses and costs
17 incurred in doing the repair work.

18 Would the second page of this
19 document, page 481, reflect all the repair costs and
20 expenses you incurred through December 31, 2017?

21 A. No. The -- on the back side of page --
22 or Exhibit 14, the repair list is simply operating
23 costs. If you look down and see, I have got --
24 August 24th, about two-thirds of the way down, I have
25 got a cleaning there of Unit B expense and then we

1 have some power expenses that I had to pay since that
2 was going on.

3 So we kept everything separate as far
4 as what would have been an expense due to the flood
5 and then just normal operating expenses.

6 Q. I see what you're saying.

7 So, in fact -- so, in fact, I got it
8 backwards. This document -- this total reflects
9 expenses and costs that were not related to the
10 flood?

11 A. Correct.

12 Q. And so nowhere in Exhibit -- nowhere in
13 Exhibit 14 are there numbers that reflect expense and
14 repairs incurred responding to the flood?

15 A. The only things I would highlight would
16 be the -- I refunded the security deposits to the
17 tenants A and C just in good faith of realizing what
18 they had gone through. And then also in the next
19 section, the rental income section is also reflected
20 where I did not receive any rents from September
21 through December on three of the four units.

22 Q. Are the rental rates -- well, would you
23 compare for me the rental rates of the units in July
24 of 2018 compared to July of 2017?

25 A. July of 2017, the rents were as

1 follows: For Unit A, 1075; Unit B, 1,000; Unit C,
2 1,000; and Unit D, 1,000.

3 In July of 2018, the rents are as
4 follows: Unit A is 1,300; Unit B is 1,125; Unit C is
5 1,300; Unit D is still at 1,000.

6 Q. Do you keep a 2018 income rental and
7 expense sheet -- worksheet?

8 Similar to what we see in 2013 and
9 '14, do you keep one for 2018 on an ongoing basis?

10 A. I do.

11 Q. Outside of the cost of flood repair,
12 how did the expenses in the property -- have they
13 changed between 2017 and 2018?

14 A. I would have to refer back to the sheet
15 to answer that conclusively, but off the top of my
16 head, no.

17 (Exhibit 15 marked)

18 MR. WICKERT: Thank you.

19 Q. (BY MR. DAIN) Handing you what's been
20 marked Exhibit 15. And I will represent it begins
21 with GoodResourcesLLC 587 and ends with LLC 605.
22 There is some blank pages and some bar pages and it
23 looks like a document that maybe got converted in a
24 way that messed it up some.

25 What is this document?

1 account?

2 A. Off the top of my head, I don't know.

3 Q. Over 20?

4 A. Yes.

5 Q. Over 30?

6 A. I would guess, yes.

7 Q. Over 40?

8 A. I don't know.

9 Q. Okay. After you acquired the property,
10 did you ever try to market or sell that property
11 between the time you purchased it and today?

12 A. No.

13 Q. Do you have any photographs of the
14 interior of the property before Harvey?

15 A. Yes.

16 Q. And what are those? Have they been
17 produced?

18 A. We produced everything we have been
19 requested. I don't know if that was on the list or
20 not, but if they were requested, they have been
21 produced.

22 Q. Okay. So you have delivered your
23 attorney photographs of the interior of your property
24 before Harvey?

25 A. Again, I would have to look back at

1 what was exactly requested. We have -- anything that
2 has been requested from my attorney has been
3 submitted.

4 Q. And so let me just go back to the
5 question. And maybe they are. I don't recall as I
6 sit here.

7 A. Yeah.

8 Q. And so my question is simply: Do you
9 have interior photographs of the property before
10 Harvey?

11 A. Yes.

12 Q. For the downstairs units, when you did
13 the drywall repair, did you replace the entire
14 drywall or a portion of it?

15 A. We replaced all of the drywall up to
16 the ceiling. So all of the walls. The ceiling was
17 intact and -- as of our moisture test.

18 Q. Did you moisture test the -- why did
19 you decide to do the entire drywall?

20 A. Yeah, the walls did not pass the
21 moisture test.

22 Q. You mentioned the downstairs flooring
23 before that you -- that I believe you mentioned was
24 new after you purchased it?

25 A. Uh-huh.

1 Q. And what was -- what was the nature of
2 that flooring?

3 A. Unit A was ceramic tile and Unit C was
4 a wood floor throughout.

5 Q. Since the repairs, are there granite
6 countertops in the units today?

7 A. They are some sort of stone. I believe
8 they are granite, yes.

9 Q. Okay. And what were they before?

10 A. Formica perhaps. I'm not sure exactly
11 what the term was.

12 MR. DAIN: Okay. Let me take a little
13 break and we will be done.

14 MR. WICKERT: Okay.

15 (Recess taken)

16 MR. DAIN: Back on the record.

17 Q. (BY MR. DAIN) Any security cameras on
18 Memorial Mews?

19 A. No.

20 Q. Are you aware of the Memorial Day
21 Flood?

22 A. Peripherally.

23 Q. Okay. No knowledge of the Memorial Day
24 Flood and whether that event had any impact on
25 flooding in your neighborhood, in the Memorial Mews

1 neighborhood?

2 A. I know it did not affect the Memorial
3 Mews neighborhood.

4 Q. Okay. How about the Tax Day Flood, do
5 you have any knowledge about whether the Tax Day
6 Flood had any flooding in the neighborhood near
7 Memorial Mews?

8 A. There was impact for the Tax Day Flood.

9 Q. Do you know when the building was
10 built?

11 A. In 1980 -- early 1980s. I would have
12 to go back and check the exact records.

13 Q. How many units -- similar units are
14 there at Memorial Mews?

15 A. There are approximately 30-odd -- the
16 number could be within five of that -- unit buildings
17 there on the street.

18 MR. DAIN: All right. No further
19 questions.

20 Sorry for the event. I'm sorry for
21 your losses.

22 THE WITNESS: Thank you.

23 MR. DAIN: Pass the witness.

24 EXAMINATION

25 Q. (BY MR. MCGEHEE) All right. Jeremy, I

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Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF

9 WAYNE HOLLIS

10 JULY 19, 2018
11 -----

12 ORAL DEPOSITION OF WAYNE HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 8:59 a.m. to
16 12:13 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.
23
24
25

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<p style="text-align: right;">Page 66</p> <p>1 And I know this is an electronic signature</p> <p>2 down on the bottom, but did you and wife -- your wife</p> <p>3 review this and sign this document?</p> <p>4 A. Yes.</p> <p>5 Q. On January 3rd, 2018, correct?</p> <p>6 A. I thought it was December.</p> <p>7 Q. There may be an earlier one that was December.</p> <p>8 And I'll represent to you I think I saw one from</p> <p>9 December that maybe just had your signature on it, and</p> <p>10 then this one was a little later that had both of your</p> <p>11 signatures.</p> <p>12 A. Okay. One side is January, and one side is</p> <p>13 December.</p> <p>14 Q. Oh, okay. I think -- I think I may have marked</p> <p>15 the wrong one because we were just looking at the -- at</p> <p>16 the January one.</p> <p>17 A. You marked December.</p> <p>18 Q. Well, no, we just wanted to look at the --</p> <p>19 yeah, we don't need that page. We'll mark that one,</p> <p>20 which is just the January page which is the later one.</p> <p>21 A. Okay.</p> <p>22 Q. But I'll show you just for the record. So the</p> <p>23 page that is Hollis 00770, which does have a date of</p> <p>24 December 5th, 2017, at least this copy just had your</p> <p>25 signature on it?</p>	<p style="text-align: right;">Page 68</p> <p>1 this form identifies the full cost of repair or</p> <p>2 replacement as \$191,672.53. Is that accurate for the</p> <p>3 purposes of this form?</p> <p>4 A. No. That was an estimate.</p> <p>5 Q. That's the estimate. Okay.</p> <p>6 And based on the work you've done thus far</p> <p>7 on your home, would you say the -- the cost of repair or</p> <p>8 replacement has been different than that amount?</p> <p>9 A. Far exceeded that.</p> <p>10 Q. Okay. And what's -- what's your estimate as to</p> <p>11 how far above that number it has exceeded?</p> <p>12 A. For --</p> <p>13 MR. HARTMAN: Objection to the extent it</p> <p>14 calls for expert testimony.</p> <p>15 Q. (BY MS. TARDIFF) Just your estimate.</p> <p>16 A. Probably going to end up over 400,000.</p> <p>17 Q. For all of the repairs on your home?</p> <p>18 A. For repair and replacement.</p> <p>19 Q. For replacement. Okay.</p> <p>20 (Exhibit 9 marked.)</p> <p>21 Q. (BY MS. TARDIFF) And, Mr. Hollis, I've handed</p> <p>22 you what we've marked as Hollis Deposition Exhibit 9.</p> <p>23 The Bates number is Hollis 00771. The caption on this</p> <p>24 is Department of Homeland Security Federal Emergency</p> <p>25 Management Agency National Flood Insurance Program</p>
<p style="text-align: right;">Page 67</p> <p>1 A. Correct.</p> <p>2 Q. So the January 1 was signed by both you and</p> <p>3 your wife?</p> <p>4 A. Correct.</p> <p>5 Q. So did you and your wife both review this proof</p> <p>6 of loss for the flood insurance before signing it?</p> <p>7 A. Correct.</p> <p>8 Q. And does this form accurately identify through</p> <p>9 your flood insurance claim the cost of repair or</p> <p>10 replacement of your building and contents?</p> <p>11 A. No.</p> <p>12 MR. HARTMAN: Objection; form. If you just</p> <p>13 give me a second so that if I have an objection, I can</p> <p>14 get it in. I know you're getting it from both sides,</p> <p>15 from Morgan and I.</p> <p>16 Q. (BY MS. TARDIFF) So I'm looking at Item No. 5.</p> <p>17 And let me back up. So your policy coverage for your</p> <p>18 flood insurance was 250,000 for the building and 100,000</p> <p>19 for the contents, correct?</p> <p>20 A. Correct.</p> <p>21 Q. So under Item 1, full amount of insurance, that</p> <p>22 350,000 is the combination of the building and contents</p> <p>23 coverage, correct?</p> <p>24 A. Correct.</p> <p>25 Q. Okay. So for insurance purposes, under Item 5,</p>	<p style="text-align: right;">Page 69</p> <p>1 statement as to full cost of repair or replacement under</p> <p>2 the replacement costs coverage subject to the terms and</p> <p>3 conditions of this policy.</p> <p>4 That's a mouthful.</p> <p>5 And, Mr. Hollis, this has some of the same</p> <p>6 information that we just looked at on Exhibit 8, so I</p> <p>7 won't re-ask you those questions.</p> <p>8 But under 8, there's an indication of a</p> <p>9 supplemental claim in the amount of \$10,941.86. Do you</p> <p>10 recall what that was for?</p> <p>11 A. I do not.</p> <p>12 Q. Do you recall whether that supplemental claim</p> <p>13 was paid by your flood insurance policy?</p> <p>14 A. I assume it was.</p> <p>15 MS. TARDIFF: Why don't we go ahead and</p> <p>16 take another 5-, 10-minute break, and I'll review my</p> <p>17 notes. Let's go off the record.</p> <p>18 (Break taken from 10:47 a.m. to 11:02 a.m.)</p> <p>19 MS. TARDIFF: Let's go back on the record.</p> <p>20 A. And I need to correct one thing. We were all</p> <p>21 talking.</p> <p>22 Q. (BY MS. TARDIFF) Sure.</p> <p>23 A. I did salvage an armoire out of the lower floor</p> <p>24 that we've spent \$1,500 on totally rebuilding. It was</p> <p>25 an old armoire. And then our family portraits that was</p>

18 (Pages 66 - 69)

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<p style="text-align: right;">Page 70</p> <p>1 hanging as you go up the staircase and some on the 2 walls, when we went back before the water rose totally, 3 I did take those out, just for the record. So when I 4 say we didn't salvage anything but clothes, we did do 5 that. 6 Q. Okay. Very good. Well, I'm glad, especially 7 with the portraits, you were able to save those. 8 A. Yeah, we were able to save those. 9 Q. Yeah. And I mean, was there some damage to the 10 armoire that you had rebuilt? Or were you -- 11 A. Oh, totally damaged, but they have totally 12 rebuilt it. That's what I'm saying. They took it 13 totally apart and had to rebuild it and charged us 14 \$1,500 for rebuild. We haven't gotten it back, but 15 we're in the process of getting it back. It's in 16 rebuild. 17 Q. Okay. Thank you for that clarification. 18 And any -- anything else from the first 19 floor that you're trying to restore? Any -- any rugs or 20 anything like that? 21 A. Yes. We pulled rugs and had them at the rug 22 place, and they're all in that stuff where you see 23 oriental rug that we took the wet rugs and took them to 24 those places and they've done that, yes. Just the -- I 25 don't know what y'all call it, decorative rugs or the</p>	<p style="text-align: right;">Page 72</p> <p>1 to dry out the house and pass the mold inspection. And 2 I think I paid them about 10- or 12,000. It's on the 3 records in all of this stuff. And they okayed the house 4 to rebuild. 5 And the structure, basic structure was 6 fine. But we tore it out to the brick and didn't 7 replace the brick. We started with a new technique that 8 they can put in a foam substance and still keep your 9 aeration area between your brick and your walls. And 10 it's just been totally rebuilt. 11 Cabinets, I mean everything came out to the 12 studs in the wall and to the runners in the second 13 floor. All new Sheetrock, all new lighting, all new 14 wiring, all new windows, everything. 15 Q. And when you say "runners," runners to the 16 second floor, are you talking about the runners on the 17 stairs or -- 18 A. No. I'm talking about the cross-members 19 that -- your Sheetrock goes on the ceiling. We had to 20 take all that out and then start back from the second 21 floor down. 22 Q. So from -- from the ceiling of your first 23 floor -- 24 A. Yeah, ceiling all gone out. Everything went 25 out.</p>
<p style="text-align: right;">Page 71</p> <p>1 big -- that you put over the flooring. 2 Q. Uh-huh. That's a good description. 3 A. But we salvaged six or eight of those. 4 Q. Okay. And did you say at this point you and 5 your wife are still living with your son? 6 A. Yes. 7 Q. Okay. But you are working on the -- on the 8 rebuild of your home? 9 A. Yes. We're almost complete. 10 Q. Okay. So -- so tell me about that -- that 11 process and from -- you know, if you kind of walk me 12 through when you were first able to start that rebuild 13 and where you are today. 14 A. For the record, it's been a nightmare and a 15 cost overrun. We started in -- I think we got our -- 16 and I'm just recalling this -- bids in October to start 17 in November. And all of the contractors are bids in 18 there, trying to work on seven different homes. And 19 they work on ours a little while and leave and come back 20 and go somewhere else. And it's just been a long, 21 tiring process; huge cost overrun. 22 But we have completely rebuilt the bottom 23 of the house. We tore it out to the rafters on the top 24 floor because of the water damage. I had -- I think 25 they're called SERVPRO come in from Ohio or Pennsylvania</p>	<p style="text-align: right;">Page 73</p> <p>1 Q. Okay. And once you pulled everything out and 2 you know, down to -- down to the brick, did you have any 3 foundation issues that you needed to address? 4 A. None. 5 Q. Okay. And you say you're close to -- close to 6 completing at this point? 7 A. Yes. 8 Q. Do you have an anticipated date you'll be able 9 to move back in? 10 A. We're going to try to move in next week 11 partially. Construction is going to go on about another 12 six weeks of painting and touching up and finishing. I 13 just got the telephones in today. That's who I was 14 communicating with. We finally got the telephones back 15 in and working today. 16 Q. Did you have to do any -- any rebuild or 17 restoration of -- of your drainage features outside the 18 house? 19 A. No, other than just clearing up the clogged 20 drain. 21 (Exhibit 10 marked.) 22 Q. (BY MS. TARDIFF) So, Mr. Hollis, I'm going to 23 give you a group of four photos that I'm marking as 24 Hollis Deposition Exhibit 10. The Bates numbers are 25 LUC 0002197 to 2200.</p>

19 (Pages 70 - 73)

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<p style="text-align: right;">Page 98</p> <p>1 A. Yes.</p> <p>2 Q. I did want to clarify one thing. And you know,</p> <p>3 we can actually use Exhibit 16 to -- to clarify.</p> <p>4 You had discussed earlier the flow of water</p> <p>5 that you experienced on the 29th and the 30th when you</p> <p>6 were returning to your home as moving from the north to</p> <p>7 southeast; is that correct? Northwest to southeast?</p> <p>8 A. Yes, northwest to southeast.</p> <p>9 Q. Can you mark on this exhibit the direction that</p> <p>10 you experienced the water flowing?</p> <p>11 A. What color? Red?</p> <p>12 Q. Black, if you would. I think that's what we</p> <p>13 used on the other -- on the other exhibit.</p> <p>14 A. The water -- the water came across the</p> <p>15 neighborhood like this.</p> <p>16 Q. And did that water meet up with the bayou</p> <p>17 further downstream?</p> <p>18 A. Well, it was all one contiguous body of water.</p> <p>19 Q. Okay. Understood.</p> <p>20 MS. TARDIFF: Could -- just -- and I don't</p> <p>21 want to interrupt your questioning. But just for the</p> <p>22 record, could you make that black line into an arrow?</p> <p>23 MR. HARTMAN: Yeah. That's an excellent</p> <p>24 idea. Uh-huh.</p> <p>25 MS. TARDIFF: Just for clarity. Thank you.</p>	<p style="text-align: right;">Page 100</p> <p>1 Q. You think you would have noticed that amount of</p> <p>2 gap even with the carpet covering it?</p> <p>3 A. Sure. Stepping on the carpet, you would have</p> <p>4 fallen through.</p> <p>5 Q. And I just want to ask you a couple last</p> <p>6 questions about where we are now. So we've talked a lot</p> <p>7 about -- about the repairs that you've done to the home.</p> <p>8 Is -- am I correct in understanding that those are still</p> <p>9 ongoing?</p> <p>10 A. Yes, correct.</p> <p>11 Q. So is there a -- a full tally of what the costs</p> <p>12 are going to be to get sort of back to where you were?</p> <p>13 A. No. We're adding costs daily.</p> <p>14 Q. And I also want to clarify. So you moved in</p> <p>15 with your son shortly after -- in fact, immediately</p> <p>16 after you evacuated, correct?</p> <p>17 A. Immediately after.</p> <p>18 Q. And you have been with him since late August of</p> <p>19 last year?</p> <p>20 A. Yes.</p> <p>21 Q. Are you paying rent to your son?</p> <p>22 A. We paid him \$6,000 up front in October or so to</p> <p>23 do some work, make it more comfortable for us. And</p> <p>24 that's the only rent I've paid him.</p> <p>25 Q. Have you helped out in any other ways, picking</p>
<p style="text-align: right;">Page 99</p> <p>1 A. (Witness complies.)</p> <p>2 Q. (BY MR. HARTMAN) Thank you, Mr. Hollis.</p> <p>3 I just wanted to clarify because I know we</p> <p>4 talked about several foundations, and I want to make</p> <p>5 sure we've got them all straight. Have you had any</p> <p>6 foundation issues in your home before Hurricane Harvey?</p> <p>7 A. We're one of the few homes in the neighborhood</p> <p>8 that has never had foundation problems, nor has had to</p> <p>9 repair. Ours was built evidently on pier and beam or</p> <p>10 something. I wasn't there for the construction, but</p> <p>11 it's a very solid foundation.</p> <p>12 Q. And you didn't have any foundation issues on</p> <p>13 the home after the flooding either?</p> <p>14 A. Other than the little separation from the</p> <p>15 chimney from -- which is outside the foundation of the</p> <p>16 home.</p> <p>17 Q. And so the -- the foundation crack that we were</p> <p>18 looking at, that was in the separate garage; is that</p> <p>19 correct?</p> <p>20 A. That was in the garage.</p> <p>21 Q. And you hadn't seen that crack at least before?</p> <p>22 A. We had seen a hairline, but it was covered with</p> <p>23 carpet. And then when it opened up, as we went in back</p> <p>24 after the floodwaters, pulled the carpet, it was 6,</p> <p>25 7 inches wide at that time.</p>	<p style="text-align: right;">Page 101</p> <p>1 up utilities or anything like that?</p> <p>2 A. Yes. We just bought him a new stove, different</p> <p>3 things. I've repaired some stuff. Had some contractors</p> <p>4 working to improve, and he didn't want any more payment.</p> <p>5 Q. Understood. That's a good son. I hope my</p> <p>6 folks' place never floods.</p> <p>7 A. He is ready for us to leave. We're overdue.</p> <p>8 Q. Understood.</p> <p>9 MR. HARTMAN: Well, I think that that is</p> <p>10 all I have.</p> <p>11 FURTHER EXAMINATION</p> <p>12 BY MS. TARDIFF:</p> <p>13 Q. So let me ask a few follow-up questions, if I</p> <p>14 could, just for clarification on some things.</p> <p>15 A. Sure.</p> <p>16 Q. Thank you.</p> <p>17 So the second home that you lived in on</p> <p>18 Honeywood Trail, you said that was adjacent to Buffalo</p> <p>19 Bayou?</p> <p>20 A. It's about 400 yards from Buffalo Bayou.</p> <p>21 Q. Okay. So did -- did your property actually</p> <p>22 come right up to the -- the edge of the green space</p> <p>23 or...</p> <p>24 A. No. No. We -- three houses between us and</p> <p>25 then a big office building and then the bayou on Dairy</p>

26 (Pages 98 - 101)

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Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE: UPSTREAM ADDICKS)
3 AND BARKER (TEXAS))
4 FLOOD-CONTROL RESERVOIRS)
5) CASE NO. 17-cv-9002L
6 THIS DOCUMENT RELATES TO:)
7 ALL DOWNSTREAM CASES)

ORAL DEPOSITION

JOHN BRITTON

30(B)(6) MEMORIAL SMC INVESTMENT 2013, LP

JOHN BRITTON

13 ORAL 30(b)(6) DEPOSITION OF JOHN BRITTON,
14 Memorial SMC Investment 2013, LP, produced as a
15 witness at the instance of the JOHN BRITTON and duly
16 sworn, was taken in the above-styled and numbered
17 cause on the 16th day of July, 2018, from 9:10 a.m.
18 to 2:19 p.m., before Shauna Foreman, Certified
19 Shorthand Reporter in and for the State of Texas,
20 reported by computerized stenotype machine at the
21 offices of Vinson & Elkins, 1001 Fannin, Suite 2500,
22 Houston, Texas, pursuant to the Federal Rules of
23 Civil Procedure and the provisions stated on the
24 record or attached hereto.

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1 Q. (BY MR. DAIN) Is there any indications
2 that -- that there is a resistance to leasing in the
3 building because of the Harvey flood?

4 A. Well, we haven't -- and I mentioned before,
5 I'm not sure if we have anybody living on the first
6 floor yet. I'm not sure we've leased any first-floor
7 units.

8 Q. Understood.

9 A. If you're talking about being impacted by
10 the flood, that would be the first line of water
11 entry. We've received a lot of questions -- we've
12 had residents ask for elevation certificates so they
13 can get insurance, including flood insurance.

14 So I'm not answering your question
15 directly. They're -- residents are aware that the
16 property flooded, new residents coming in.

17 Q. Understood, and I'm -- and I appreciate the
18 response.

19 Have you heard from any of the folks
20 that are, I guess, front line in the effort to fill
21 the tenants back up that there is -- there are people
22 that are saying, "I won't" -- words to the effect "I
23 don't want to be here because of the prior flood"?

24 A. Well, we've had people who moved out
25 because of the flood and didn't come back. Keep in

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1 mind, for every visitor to the property, prospective
2 resident, you typically in the apartment industry --
3 or at least at our class of apartments, you typically
4 close about 20 percent of the traffic. That means
5 eight out of every 10 who come into your property
6 don't lease from you. Is it because we flooded? Is
7 it because they don't like the manager? You know,
8 that's hard for me to answer.

9 Q. Let me just back up. I'm about to talk to
10 you about Harvey, but you talked a little earlier
11 about the permission to reoccupy in December --
12 December 20.

13 Did the townhouse units get -- was
14 there -- did they also suffer an inability to occupy
15 and, if so, when was that released?

16 A. Yes, and the same date. So there's a
17 couple of factors involved. Initially, Friday after
18 the flood -- if Monday was the 28th -- 31st -- the
19 mayor issued a mandatory evacuation of all properties
20 within -- I can't give you the boundaries, but we
21 were right smack dab in the middle of it. By that
22 time, Centerpoint had cut off our power, as well. So
23 anybody who wanted to stay pretty much had to leave.
24 We did have one guy who was a, quote, unquote,
25 survivalist stay the whole time. We couldn't

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1 physically go pull him out.

2 The city issued a mandatory
3 evacuation. Sometime after that when the water came
4 down, the city, which had initially said they weren't
5 going to enforce a lot of code-related issues related
6 to moving back into the property, sort of had a
7 reversal of that and the city required us to meet
8 certain thresholds, which we had to do anyway.

9 For instance, the fire pumps. They
10 all stopped working. You can't have residents living
11 at a multi-story apartment without fire pump
12 pressure. We had to replace all of our transformers.
13 They are designed to stay underwater for, I think, 36
14 hours. But two weeks, no way. So even the
15 transformers that were working we had to replace
16 because you can't rely on those that were operating
17 the property.

18 Over and above that, the city in
19 certain instances required us to build back to a
20 higher code than we originally built to. I think we
21 built to 2011. We had to rebuild to 2016. They
22 wouldn't let us, in certain areas of the property,
23 for instance, pigtail into the existing electrical.
24 The wires that were underwater, they wouldn't let us
25 splice into them. But in other areas, they would.

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1 So in some areas, we had to completely rewire.

2 What was your question again? Sorry.

3 Q. I was trying to do what you were doing,
4 which was work backwards from the December reoccupy
5 opportunity to the loss of occupation. At least you
6 made that leap, so I'll follow you.

7 A. Right. So -- okay. I know where I was
8 going.

9 MR. McNEIL: Wasn't your question
10 dealing with the occupancy of the townhomes versus
11 the apartments, and he was explaining what all had to
12 be done in order to gain occupancy and why it all
13 happened at the same time?

14 A. So when we had to re-permit for these
15 higher codes and things like that, the city viewed
16 that as a permit over the entirety of the property
17 and they would not allow us to reoccupy until the
18 common area, like the electrical and the fire pump,
19 all those things were completed for the entirety of
20 the property.

21 So as a result, the reopening of the
22 property occurred simultaneous to the townhouses and
23 the flats. That was in terms of -- I take that back.
24 I'm not sure we had any of the -- the townhouses
25 actually available in December. So we could have --

24 (Pages 90 - 93)

John Britton

July 16, 2018

<p style="text-align: right;">Page 94</p> <p>1 if the units were rebuilt, I think we could have 2 moved people in, but I don't think we got the 3 turnover of the first townhouse until February. 4 Q. (BY MR. DAIN) They just -- while you had -- 5 you weren't legally prohibited from doing that. You 6 weren't physically ready for those folks? 7 A. We weren't legally prohibited as a property 8 level, but then they had individual permits on the 9 townhouse buildings that had not yet -- there wasn't 10 as much work on the townhouses, but it had to be 11 restored before people could move back in. 12 MR. DAIN: Off the record for a 13 second. 14 (Recess from 1:15 p.m. to 1:23 p.m.) 15 Q. (BY MR. DAIN) Bringing you to late 16 August 2017 and the Harvey storm begins, where are 17 you? Are you in Houston area? 18 A. I'm embarrassed to say on Saturday or 19 Friday, I decided it would be a good idea to take my 20 dog and 12-year-old to our house in Galveston and 21 watch the storm down there and got down there and was 22 stuck four or five days. 23 Q. Okay. So when did you return to Houston, 24 then? 25 A. I returned to Houston on Wednesday</p>	<p style="text-align: right;">Page 96</p> <p>1 with the residents who were still remaining, pleaded 2 with them to leave. At that point, the mandatory 3 evacuation had not been made by the city, but it was 4 deeply concerning that we were walking through the 5 property that was -- depending on the elevation, 6 10 -- you know, 5 and a half feet to 10 feet from the 7 street or the finished first floor. 8 So essentially the majority of the 9 first floor was submerged, yet the power was on to 10 the entirety of the property, which obviously creates 11 a hazard of unbelievable proportion. If there were a 12 fire, no fire department entity would be able to save 13 these people. 14 So we pleaded for them to leave. A 15 lot of them were dug in. We couldn't physically pull 16 them out of there and make them leave. But that's 17 what we witnessed on that Wednesday, sort of utter 18 devastation. 19 Q. Who from -- whether it be Grayco 20 Management, LLC or who from any of the Grayco 21 entities was present during the beginning of the 22 storm and during the initial days of flooding? 23 A. Well, primarily it was Lauren Smith, who 24 was the property manager. She resided at the 25 property. She resided on the first floor of the</p>
<p style="text-align: right;">Page 95</p> <p>1 following the storm. 2 Q. Okay. And when did you first visit 3 Parkside? 4 A. Wednesday, the 30th. 5 Q. And what did you observe on the 30th? 6 A. Well, we took a boat to the property, a 7 17-foot fishing boat, not a flat john boat. So we 8 were navigating a hull that went several feet into 9 the water. Pulled up to the northeastern corner of 10 the property, the corner on South Mayde Creek, kind 11 of pulled the boat up next to the apartment balconies 12 on the first floor and the second floor. 13 One of the individuals on the boat 14 jumped up and climbed up to the second floor from the 15 boat. So that's how high the water was. I, again 16 not making a very sound decision, decided to slide 17 off the boat into the first floor. First came down 18 on top of a fence between my legs, which was not very 19 smart. Pulled myself back up, slid down all the way 20 to the ground, and the water was up to about my chin. 21 Didn't have a life vest on, but I sort of forced 22 myself over to the stairs that led up to the second 23 story. 24 So made it up to the second story. We 25 at that point walked through the building, conversed</p>	<p style="text-align: right;">Page 97</p> <p>1 property. So all of her belongings were -- well, I 2 say all of her belonging were wiped out. She managed 3 to move some of her stuff up on Sunday evening to a 4 second or third floor unit, but she was there the 5 majority of the time until all the residents were 6 gone, all except the one we talked about who didn't 7 ever leave. 8 There was one individual in the back 9 of the property in a townhouse who said he wasn't 10 going anywhere. He stayed the whole time, and 11 actually we were in contact with him to make sure he 12 was okay and he was taking pictures and watching out 13 for the place. 14 MR. DAIN: I'll go ahead and have this 15 marked. 16 (Exhibit 17 marked) 17 Q. (BY MR. DAIN) I'm handing you what's been 18 marked Britton Exhibit Number 17. It's a series of 19 text messages. Because of the effort today to 20 reproduce these -- get copies of these documents here 21 and to get these documents in a correct order, 22 although the first page has a Bates stamp of 685, the 23 rest of them are not -- many of the others are not 24 Bates stamped. I'm not sure if any of them are. 25 Let me ask you: Have you seen that</p>

25 (Pages 94 - 97)

Arnold Milton

July 10, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
 2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
 3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
 4 _____) 17-cv-9002L
 5 THIS DOCUMENT RELATES TO)
 6 ALL DOWNSTREAM CASES)

7 -----
 ORAL DEPOSITION OF

8 ARNOLD MILTON

9 JULY 10, 2018
 10 -----

11
 12 ORAL DEPOSITION OF ARNOLD MILTON, produced as
 13 a witness at the instance of the United States, and duly
 14 sworn, was taken in the above-styled and numbered cause
 15 on the 10th day of July, 2018, from 9:02 a.m. to
 16 2:48 p.m., before Morgan Veletzuy, CSR in and for the
 17 State of Texas, recorded by machine shorthand, at
 18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
 19 Suite 4000, Houston, Texas 77056, pursuant to the
 20 Federal Rules of Civil Procedure and the provisions
 21 stated on the record or attached hereto; that the
 22 deposition shall be read and signed before any notary
 23 public.
 24
 25

1 be about 5 feet.

2 Q. And the two-drawer unit approximately --

3 A. Half that. It was half that. Maybe 2 1/2
4 to 3 feet tall.

5 Q. We've done a really good job of not talking
6 over each other or past each other so far, I'd just ask
7 that you let me finish the questions before answering if
8 that's okay.

9 A. Oh, I'm sorry. I thought you did.

10 Q. Yeah, no problem.

11 So you said the two-drawer unit was
12 probably about 2 1/2 to 3 feet tall?

13 A. Uh-huh.

14 Q. Okay. And the small desk, approximately what
15 height was the file drawer in the small desk?

16 A. What was that desk? About 3 feet. And we had
17 a large sliding drawer on the right side lower drawer --
18 no, sorry, middle drawer. We had two thin drawers --
19 one above and one below. But that sliding drawer was
20 where we kept the hanging files in the house.

21 Q. And approximately what was the height of that
22 small drawer?

23 A. The small drawer?

24 Q. Sorry. Let me rephrase the question.

25 The drawer that you mentioned with the

1 vertical files that was in the desk, approximately what
2 height was that drawer at?

3 A. I guess 2 feet, roughly.

4 Q. We'll get into details of Harvey later on, but
5 approximately what was the depth of the inundation of
6 the water in your home?

7 A. About 4 feet 4 inches, plus or minus.

8 Q. Were any documents that were in the two-drawer
9 unit salvageable?

10 A. No. You've got to understand the mentality of
11 being in a flooded house. You couldn't even open the
12 drawers, everything was swollen. And my son-in-law and
13 three of his college buddies came in with half a dozen
14 black kids they had hired from Home Depot and started
15 taking that house apart as soon as we could get back in,
16 pumping out the rest of the water. And we stacked it
17 all in the front yard, it was almost as high as a man on
18 the curb. All the way up and down the street, the same
19 situation. So a lot of stuff just went out.

20 And if I had all of the time in the world I
21 would have drained my Harley motorcycle and oiled it up
22 and tried to salvage what else I could. Our clothes
23 were totally mildewed and everything stank because the
24 sewer water backed up into the house. Shoes and stuff
25 were floating around. It was -- it was kind of a devil

1 take behind most deal to try to save the house. And it
2 was almost impossible to supervise people under those
3 conditions, so a lot of stuff just went out the door.
4 And I noticed there were people going up and down the
5 street picking up stuff. Some of our appliances
6 disappeared over the first night. My file cabinets
7 disappeared. And people were scrounging up and down the
8 neighborhood. And it was very hard to save or salvage
9 anything.

10 Q. So just going back to the house records for a
11 moment.

12 A. Uh-huh.

13 Q. The four-drawer unit, that was placed on the
14 curb and you did not salvage any documents from that
15 unit; is that correct?

16 A. No. No. It was gone.

17 Q. The two-drawer unit --

18 A. Same thing.

19 Q. -- was anything salvaged from that?

20 A. No.

21 Q. The desk, was anything salvaged from the desk?

22 A. No.

23 Q. And all of those things, the -- the four-drawer
24 unit, the two-drawer unit, and the desk are gone?

25 A. Yes, all gone.

1 Q. So going back to the home and whether any
2 changes were made to the home. From the time you bought
3 it to before Harvey you had mentioned, you know, some --
4 some appliances and some tile work in the kitchen. We
5 mentioned some of the other things like air-conditioning
6 units. Were there any other changes to the home during
7 that time that you can think of?

8 A. Just painting. That was about it. I kept it
9 clean and well maintained.

10 Q. When you bought the home did you buy it to use
11 as your primary residence?

12 A. Yes.

13 Q. At any point in the time that you've owned it,
14 did you use it for any other purpose?

15 A. No.

16 Q. You mentioned earlier that you have a family
17 ranch; is that correct?

18 A. Yes. Yes.

19 Q. About how long does it take to drive from the
20 Silvergate home to the family ranch?

21 A. Two hours.

22 Q. When you say "family ranch," is that your side
23 of the family or Mrs. Milton's side of the family?

24 A. My side.

25 Q. How long has your family owned the ranch?

1 needles. And that was part of the problem that caused
2 that siding to be a problem. And I think now that we're
3 spending money on the house we'll probably either trim
4 that pine tree up to where it's nothing but a few
5 needles at the top or take the whole thing down. They
6 are really problems in Houston; pine trees are.

7 Q. They get too tall for the soil or something?

8 A. Well, the roots get under the slab, they shed
9 pine needles, they clog up your outside condenser units
10 on your air conditioner. The squirrels come and they
11 chew holes in your house, pretty soon you feel like
12 you're on the frontier.

13 Q. Did you plant those pine trees?

14 A. No. They were already there unfortunately and
15 I didn't pay enough attention, I was too busy trying to
16 make a living, I let them get too big.

17 Q. We've got the same problems with white pines in
18 DC.

19 A. Uh-huh.

20 Q. Have you ever had a problem with the toilets in
21 your home backing up?

22 MR. HOBBS: Objection; form.

23 A. No, not really. I regularly fix the innards of
24 the toilets, but I don't think we've ever had anything
25 back up on us.

1 Q. (BY MR. LEVINE) Let me ask it a little bit
2 differently.

3 Have you ever had an instance where your
4 toilets backed up as a result of a storm?

5 A. No. Not until Harvey when we had water in the
6 house. And I assume they backed up. I know the place
7 didn't smell very good. Obviously there was sewage in
8 the house in one form or another. We were warned not to
9 get our heads into the water. Which I promptly did when
10 I fell off the boat the first time I came back to see
11 the house.

12 Q. Oh, man. I hope you didn't get sick as a
13 result of that.

14 A. I didn't.

15 Q. Did you ever have any drainage issues with the
16 home prior to Harvey?

17 A. No. Over the course of almost 40 years my wife
18 loved to put on new mulch every year. The beds got
19 built up to the point to where they were starting to be
20 a threat to the weep holes on some portions of the
21 house.

22 But after Harvey I got out there, leveled
23 all that out. I probably had about 80 big bags of dirt
24 that I let the people who were picking up debris pick
25 up. So the slab is clear now. And when we relandscape

1 the lawn we're going to make sure that everything stays
2 where the slab can be seen.

3 Q. When you say the mulch was starting to endanger
4 the weep holes, can you describe for me what you mean by
5 that?

6 A. It means the mulch was up to the top of the
7 slab. And between the mulch and the flower beds next to
8 the house and the slab of the house itself, water would
9 accumulate. And if the water couldn't get away, it
10 would tend to go into the weep holes.

11 Now, once we tore off all of the interior
12 Sheetrock that was wet and destroyed, there was no
13 obvious damage from that. So it was starting to become
14 a threat, more probably in my mind than actually it was.
15 But I've taken the opportunity since the flood to take
16 out a lot of that mulch.

17 Q. Prior to Hurricane Harvey had you observed any
18 sort of water damage in the home as a result of the weep
19 holes backing up?

20 A. No. No.

21 Q. Is it correct that the weep holes are in the
22 foundation of your home?

23 A. No, they were above the foundation.

24 Q. Okay. So they are -- when you say "the slab,"
25 is the slab the foundation of the home?

1 you looked at the clock?

2 A. Uh-huh.

3 Q. Which clock are you referring to?

4 A. It was a grandfather clock right inside the
5 front door. And somehow it said 3:00 o'clock. I wasn't
6 aware if it was still ticking or not because the
7 pendulum of course comes down. But it said 3:00, I know
8 that.

9 Q. Do you have a clock on your bedside table?

10 A. No.

11 Q. Let me ask that again. At the time you went to
12 bed on August 28th, 2017, was there a clock on your
13 bedside table?

14 A. There may have been. You know, I don't pay any
15 attention to it. I think it's half decoration as much
16 as clock. But I know on my wife's side of the bed
17 there's a clock, but I don't think there is on my side.
18 I never paid attention to it if there is.

19 Q. Do you recall if you looked at the clock that
20 was on your wife's bedside table before going to bed on
21 August 28th, 2017?

22 A. I'm sure I did not. I'm sure I did not. The
23 first place we didn't go to sleep downstairs, we slept
24 upstairs. And we were in the guest bedroom up there --
25 or on the couches.

1 Q. Do you have a -- at the time you went to bed on
2 August 28th, 2017, upstairs in your home, was there a
3 clock anywhere near the bed that you slept in that
4 night?

5 A. I think there's a little travel clock, but I'm
6 not sure it even has batteries in it. We just don't use
7 it.

8 Q. So you said you woke up early on the morning of
9 August 28th, 2017, correct?

10 A. Uh-huh.

11 Q. Do you know approximately what time?

12 A. Well, if I had to guess, it was probably pretty
13 close to 6:00 o'clock. Maybe 7:00 at the latest.

14 Q. What did you do when you woke up?

15 A. Looked out the window to see where the water
16 was and what was going on. I looked into the living
17 room from the top of the stairs.

18 Q. What did you see?

19 A. Oh, a mess. Water. I'm trying to remember
20 when I took the pictures. I think I took some -- I may
21 have taken some pictures then. I know I took a lot more
22 when I came back with my son-in-law the following
23 Saturday. I don't remember exactly when I took them,
24 but it was either that morning some of them, or I know
25 I -- I'm pretty sure we took a lot more the following

1 Saturday. I can show you some of them if you'd like to
2 see them.

3 Q. Yeah, we might want to take a look at some of
4 those in a minute here.

5 A. Okay.

6 Q. So you woke up and you said you looked at what
7 was going on; you saw a mess and you saw water. The
8 water that was in your home, was it clear?

9 A. No, it was never clear. It was always kind of
10 murky.

11 Q. Okay. Was there any particular smell that you
12 recall?

13 A. Yeah, it didn't smell good.

14 Q. Aside from not smelling good, can you describe
15 it for me in any way?

16 A. Well, the first day that first water that came
17 in kind of smelled like dank swamp water. The following
18 Saturday it had more of a sewage to it. That's about
19 all I remember.

20 Q. Do you remember observing any sort of debris in
21 the water?

22 A. The second trip, yeah. There was some stuff
23 that you wouldn't want to touch. Most of the debris the
24 first morning were things like floating shoes and flower
25 dishes and stuff like that, books.

1 Q. When you woke up on the morning of the 28th,
2 did you still have power?

3 A. Again, I'm not sure. I -- I just don't
4 remember. I don't know why we would have needed power
5 that morning. It was just a matter of collecting a few
6 things that you can grab and getting in the boat and
7 going.

8 Q. Do both you and your wife have cell phones?

9 A. Yes.

10 Q. Did you both have cell phones during Harvey?

11 A. Yes.

12 Q. Did you have your cell phones when you woke up
13 on the morning of the 28th?

14 A. I'm pretty sure we did.

15 Q. How long between when you woke up on the
16 morning of the 28th until you were evacuated?

17 A. My son-in-law came and picked us up probably
18 about, I don't know, if I had to guess maybe 10:30,
19 11:00 o'clock. Maybe as late as 2:00 o'clock but
20 somewhere towards midday.

21 Q. When you say your son-in-law picked you up,
22 where did he pick you up?

23 A. He picked us up on Memorial Drive. He was able
24 to get through. Memorial Drive was flooded and I -- I
25 think he had to come in kind of a special way, but he

1 if I was in the right front or the back. But the depth
2 gauges on the bayous that come out of Barker and
3 Addicks, which are both to the south and the east of us,
4 they don't show waters above those bridges, I don't
5 think. Those depth gauges I think are under the
6 bridges, so I never paid much attention to them if
7 they're there at all.

8 Q. Have you ever noticed gauges on highway
9 underpasses?

10 A. Oh, yeah. This Beltway 8 where it crosses
11 I-10, that has depth gauges. Down around 610 and I-10
12 they're definitely there.

13 Q. What do you think those depth gauges are for?

14 A. They're for the water levels so you know not to
15 drive in them. Shows you how deep it is.

16 Q. So after you went back to your daughter's house
17 on the 28th -- well, let me start that again.

18 Do you know what time you got to your
19 son-in-law and daughter's house on the 28th?

20 A. I'd say noon or early afternoon. Maybe
21 somewhere in the 11:00 to 2:00 range, I think.

22 Q. And how long did you stay there?

23 A. We're still there.

24 Q. Okay. Let me -- let me ask a slightly
25 different question.

1 When was the first time you returned to
2 your 850 Silvergate home?

3 A. The following Saturday. My son-in-law and I
4 went back in a boat with a pretty big outboard. And
5 like I say, when I turned into the front yard I fell off
6 the boat. And then he and I went into the house and the
7 water was up to here on me. And obviously it had been
8 higher based upon some of the stains on the wall. And
9 we wandered around the house and picked up whatever and
10 put it in plastic bags. I got my favorite boots, they
11 were floating solo up. And I use those to work in the
12 yard now.

13 But we took pictures. The refrigerator was
14 floating in the kitchen. The piano and a few other
15 pieces of furniture were under water in the living room.
16 And everything we put on tables was soaked,
17 unfortunately. We had stacked a lot of rugs and stuff
18 up there. And we had to have all -- all of that
19 cleaned. Stuff we could save, which was a couple of
20 pretty good-sized rugs, we had those cleaned. But we
21 stayed probably about 40 minutes and left.

22 Q. During that previous answer you said water was
23 about up to here and you pointed to your chest. Can you
24 estimate about how high that was?

25 A. However tall this is, I don't know. Whatever

1 you guys think. But that tall. 4 and a half, 4,
2 somewhere in that range.

3 Q. 4 to 4 and a half feet you're suggesting?

4 A. Well, let's say 4 feet. It's probably 4 feet,
5 somewhere in that range.

6 Q. You also had indicated at the start of that
7 answer a moment ago that it was the -- the following
8 Saturday?

9 A. Uh-huh.

10 Q. Do you know what the date was?

11 A. I don't. I'd have to look at it.

12 Q. Do you think that could have been Saturday,
13 September 2nd, 2017?

14 A. It was the following Saturday, whatever that
15 was. That's about right.

16 Q. You said on that following Saturday. And it
17 was Saturday, September 2nd was the date of the Saturday
18 after August 28th?

19 A. Yeah. Yeah, right.

20 Q. You were at the home for about 40 minutes?

21 A. Yeah, 30 to 40.

22 Q. And was it just you and your son-in-law?

23 A. Yes.

24 Q. And did you take anything with you when you
25 left the home on the -- September 2nd?

1 work?

2 A. Well, let's see. I guess you say I was about
3 71 and I'm almost 80 now, so it was nine years ago.

4 Q. You mentioned that you made money from the
5 ranch in the past year or so. About how much was that?

6 A. \$4,000.

7 Q. Do you know what the approximate value of the
8 ranch is?

9 A. It's 700 acres at about, I don't know, 4- to
10 5,000 an acre, maybe 6. So \$3 million.

11 Q. What do you think the 850 Silvergate property
12 was worth prior to Harvey?

13 MR. HOBBS: Objection; goes to damages.

14 A. Well, we had a tax-based appraisal, and it was
15 somewhere in the neighborhood of 424,000.

16 MR. HOBBS: I also object to the form; it
17 calls for expert testimony.

18 Q. (BY MR. LEVINE) What do you think the value of
19 the 850 Silvergate property is today?

20 MR. HOBBS: Same objections. Object that
21 it goes to damages and that it potentially calls for
22 expert testimony.

23 A. The least -- or the last similar appraisal was
24 \$257,000 roughly.

25 Q. (BY MR. LEVINE) Both of those numbers, you

1 said those were tax appraisals; is that correct?

2 A. Uh-huh. Uh-huh. Yes.

3 Q. Do you think tax appraisals are fair
4 representations of the value of a home?

5 MR. HOBBS: Objection. Calls for potential
6 expert testimony and goes to damages.

7 A. I think they're close enough for government
8 work.

9 Q. (BY MR. LEVINE) Have you ever challenged a tax
10 appraisal?

11 A. My wife challenged it once when I was overseas.
12 I don't know what was said or done, but I have not
13 personally.

14 Q. Besides the tax-based appraisals, do you -- do
15 you have any other ideas what the value of the home is
16 presently?

17 MR. HOBBS: Objection; goes to damages.
18 And objection to the form.

19 A. Not presently. There were a couple of guys
20 that came around right after the flood hitting up
21 everybody. And I asked them what they offer and they
22 said low 200. So I'm saying 220 off the street.

23 Q. (BY MR. LEVINE) Do you know if any of your
24 neighbors sold?

25 A. Yes. The -- the old man across the street

1 sold. I don't know what he got. The guy next to him
2 with the storm drain across the street, he sold and
3 moved out of the neighborhood. He asked me once if I
4 thought it would flood again, I said "If they don't fix
5 the problem it will." So he moved.

6 And then there was another guy at the end
7 of the street that sold. And all of those homes are
8 bigger than mine. And if I had to guess, I would say
9 somewhere in the 250 or 270 range. I think that's about
10 what they got.

11 Q. When you say "if they don't fix the problem,"
12 what do you mean by that?

13 MR. HOBBS: I'll object to the extent it
14 requires expert testimony.

15 A. Well, the same thing that caused our house to
16 flood, which is the opening of the flood gates.

17 Q. (BY MR. LEVINE) What would you say the
18 government specifically did to take your property?

19 MR. HOBBS: Objection; form.

20 A. They opened the flood gates.

21 MR. HOBBS: Objection. Calls for expert
22 testimony.

23 Q. (BY MR. LEVINE) Do you think the government
24 did anything besides open the flood gates to take your
25 property?

1 MR. HOBBS: Object to the form. Object to
2 the extent it calls for expert testimony.

3 A. I don't think so.

4 Q. (BY MR. LEVINE) Do you know if prior to Harvey
5 the Army Corps of Engineers ever opened the flood gates
6 on Addicks and Barker Reservoir?

7 MR. HOBBS: Objection; form.

8 A. I don't know.

9 Q. (BY MR. LEVINE) Do you know if since Harvey --
10 start that again.

11 Since Harvey, do you know if the Army Corps
12 has opened the gates on Addicks dam?

13 MR. HOBBS: Objection; form.

14 A. Well, again, I don't know if you're talking
15 about fully open or partially open. I don't know if
16 they can partially open it. I just -- I don't know.

17 Q. (BY MR. LEVINE) Besides opening gates, what
18 are you alleging that the government did to take your
19 real property?

20 MR. HOBBS: Objection; form.

21 A. That's it.

22 Q. (BY MR. LEVINE) Besides opening the gates,
23 what are you alleging that the government did to take
24 your personal property?

25 MR. HOBBS: Objection; form. Again --

1 A. That's the front window. That's the window I
2 was looking out to watch the water level on the street.

3 Q. Is that the window on your home that's closest
4 to your front door?

5 A. Yes.

6 Q. And so if I'm looking at the home, that window
7 is immediately to the right of your front door?

8 A. Exactly.

9 Q. You can set that one aside.

10 (Exhibit 43 marked.)

11 Q. (BY MR. LEVINE) Mr. Milton, I'm handing you
12 what's been marked as Exhibit 43. Please take a moment
13 to review it and let me know when you're ready.

14 A. Okay. That's basically the same window, same
15 shot closer up. And, again, if -- if you could have
16 straightened out that tape, it would have probably been
17 closer to 4.4 than 4.5, but it's showing almost
18 4.5 inches.

19 Q. Did you take this picture?

20 A. Yes.

21 Q. And is it, again, John holding the measuring
22 tape?

23 A. Yes, it is.

24 Q. Okay. And were the pictures taken in
25 Exhibits 41, 42, and 43 all taken on the same day?

1 A. Yes.

2 Q. Do you know what day these pictures were taken?

3 A. I might be able to find a date in my photos if
4 I went back and looked at my phone, I'm not sure. But
5 it was sometime after September 10th, that's for sure.

6 Q. Do you have any reason to believe that the
7 waterline moved any time from the time that it was
8 formed to the time you took the picture?

9 A. No. No.

10 Q. That holds for all three of those exhibits,
11 that question?

12 A. Yes. Yes.

13 (Exhibit 44 marked.)

14 Q. (BY MR. LEVINE) Mr. Milton, I'm handing you
15 what's been marked as Exhibit 44. Please take a moment
16 to review it and let me know when you're ready.

17 A. Okay. These are our invoices.

18 MR. LEVINE: Let the record reflect that
19 Exhibit 44 is Bates-stamped Milton 000178 through
20 Milton 000181.

21 A. All right.

22 Q. (BY MR. LEVINE) Mr. Milton, do you recognize
23 Exhibit 44 that I've just handed to you?

24 A. Yes.

25 Q. And what is Exhibit 44?

1 A. It's the invoices for work that's been done on
2 the house to this point.

3 Q. Is John the person you mentioned in the last --
4 in reference to the last couple of exhibits work for
5 Praxius Builders?

6 A. Yes.

7 Q. Okay. And has anyone besides Praxius Builders
8 done work on your home since the demolition activities
9 that you described earlier with your son-in-law and his
10 associates?

11 A. No, they've -- they've been in charge of all of
12 this. And of course they use subcontractors. But they
13 had to cosign on the SBA loan, so they're on the hook
14 too.

15 THE REPORTER: They're on the hook, too?

16 THE WITNESS: Yeah, with us legally.

17 Q. (BY MR. LEVINE) Are there any other -- let me
18 ask that again.

19 Do the expenditures reflected on Exhibit 44
20 look correct to you?

21 MR. HOBBS: Objection to the extent it goes
22 to damages only.

23 A. Yeah, they're pretty much in line with what
24 I've seen before. The mildew side treatment was
25 surprisingly expensive.

1 Q. (BY MR. LEVINE) Have you paid these invoices?

2 A. Yes, we have.

3 Q. All of them?

4 A. Yes.

5 MR. HOBBS: Objection to damages only to
6 those questions.

7 Q. (BY MR. LEVINE) As an aside, I remember seeing
8 a picture of a bathtub in the home on the first floor.
9 Is there an old bathtub that's still in the home on the
10 first floor?

11 A. It's been moved out and the new one is in its
12 place now. It was just too big and heavy to move, it
13 stayed there for a long time.

14 Q. Okay. You can set that aside.

15 MR. LEVINE: Can you pass me those maps,
16 please?

17 Q. (BY MR. LEVINE) Earlier you had described
18 piling up debris from the demolition work and the
19 cleanup work on the home; is that correct?

20 A. Yes.

21 Q. How was the debris that was piled up out in
22 front of your house removed?

23 A. They brought in a couple of small, I forgot
24 what you call them, little rubber tract- -- tractors.
25 And they got up in the yard and pushed it out into the

1 street. And then they had a big four-wheel front loader
2 with a grabber on the front that picked it up and put it
3 in big trucks, hauled it off.

4 Q. Did you have to request that service?

5 A. No, they just showed up. As I understand it,
6 the city sent them.

7 Q. Did you have to pay directly for that service?

8 A. No.

9 Q. To your knowledge, has your builder acquired
10 all necessary permits for the construction work on your
11 home?

12 A. Very carefully. He's talked about them. I
13 don't remember the details, but that was a big part of
14 hiring him, because he knew how to do it and where to
15 go.

16 (Exhibit 45 marked.)

17 Q. (BY MR. LEVINE) Okay. Mr. Milton, I'm handing
18 you what's been marked as Exhibit 45. Can you take a
19 moment to review it and let me know when you're ready.

20 A. All right.

21 Q. I'm sorry. Did you say "all right"?

22 A. Yes. Yes. I'm ready.

23 Q. Okay. Mr. Milton, what's the document that I
24 just handed you that's marked Exhibit 45?

25 MR. HOBBS: Objection; form.

Jennifer Shipos

September 19, 2018

Page 1

THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE: DOWNSTREAM ADDICKS)
AND BARKER (TEXAS))
FLOOD-CONTROL RESERVOIRS)
) SUB-MASTER DOCKET NO.
) 17-CV-90021
)

ORAL DEPOSITION OF
JENNIFER SHIPOS
September 19, 2018
Volume 1

ORAL AND VIDEOTAPED DEPOSITION OF JENNIFER SHIPOS,
produced as a witness at the instance of the DEFENDANT,
was taken in the above-styled and numbered cause on
September 19, 2018 from 3:02 p.m. to 5:05 p.m., before
Toyloria Lanay Hunter, CSR in and for the State of
Texas, reported by machine shorthand, at the law offices
of NEEL, HOOPER & BANES, P.C., 1800 West Loop South,
Suite 1750, Houston, Texas 77027, pursuant to the
Federal Rules of Civil Procedure and the provisions
stated on the record or attached hereto.

1 BY MR. DOOHER:

2 Q. And when you say "we," is that both your
3 children?

4 A. My boyfriend was staying with me at the time.
5 And my -- yeah. It was just my boyfriend and I at the
6 time.

7 Q. Had you called Ms. Willett before you went
8 over?

9 A. No, I just surprised her, "I have nowhere to
10 go. Hello."

11 Q. What did you -- excuse me.

12 Did you end up staying at her house?

13 A. Yes.

14 Q. For how long?

15 A. We stayed just one night.

16 Q. What'd you do after that first -- after that
17 one night?

18 A. Then we found a path to get to my boyfriend's
19 apartment.

20 Q. And then did you stay at your boyfriend's?

21 A. Uh-huh.

22 Q. For how long?

23 A. For a while until my house was rebuilt.

24 Q. How long was a while?

25 A. I would say approximately six months.

1 Q. So the storm was in late August.

2 A. We moved in right around maybe end of March.

3 Q. Okay. I'd like to show you what will be
4 marked Exhibit 5.

5 (Exhibits 4 and 5 marked.)

6 MR. BANES: Excuse me. Do we have a 4?

7 MR. DOOHER: Oh, no that's right.

8 BY MR. DOOHER:

9 Q. I'll represent to you that these are
10 photographs that your attorney provided on a database.
11 Each includes what's called a Bates stamp on the bottom
12 of it.

13 A. Okay.

14 Q. They're written in hand here. The photographs
15 from the database would not be printed with the Bates in
16 color. Just so you know what we're referring to.

17 A. Okay.

18 Q. Can you look through the photographs?

19 A. Yes. Yep, that's my house.

20 Q. You recognize the photograph?

21 A. Yes.

22 Q. Who took the photographs?

23 A. These I took.

24 Q. And you provided those to your attorney?

25 A. Yes. These are what I sent my attorney.

1 Q. We talked earlier about the Tax Day Flood?

2 A. Uh-huh.

3 Q. Had you heard -- had you ever heard of that
4 referred to as a Hundred-Year Storm?

5 THE REPORTER: A what?

6 MR. DOOHER: A Hundred-Year Storm.

7 A. No.

8 BY MR. DOOHER:

9 Q. Have you heard it referred to as a 500-year
10 storm?

11 A. I don't recall.

12 Q. After Hurricane Harvey, had you ever heard it
13 referred to as a thousand-year storm?

14 A. Yes.

15 Q. Excuse me. Let's take a look at the
16 photographs, please.

17 A. Okay.

18 Q. The first one is Bates stamped -- excuse me.
19 Bates stamped 000218. What's that showing?

20 A. That's my street.

21 Q. How deep -- and this is on the 29th?

22 A. This might be maybe the day after the 29th.

23 Q. Do you know if you're -- I'm sorry, what --

24 A. I don't recall dates.

25 Q. What did you take the photograph with?

1 A. This probably had to be my iPhone.

2 Q. Do you know if there's -- if it has the
3 capability to time stamp?

4 A. Probably.

5 Q. Do you still have copies of the photograph?

6 A. Yes.

7 Q. Next photograph, Shipos 000219.

8 What's that a picture of?

9 A. My house.

10 Q. And the flooding -- water flooding?

11 A. Yes.

12 Q. How deep -- if you recall, how deep would you
13 say it was on that day?

14 A. Walking into it? Or in my house?

15 Q. I'm sorry. Thank you.

16 Walking into the water in the yard?

17 A. I would say 4 feet.

18 Q. Noticing there's a -- a basketball backboard
19 in the driveway?

20 A. Uh-huh.

21 Q. Was that up before the flood?

22 A. Yes.

23 Q. Next photograph, 000220, another photograph of
24 the outside of your house?

25 A. Yes.

1 Q. The same for the next photograph?

2 A. Yes.

3 Q. Okay. Looking at the next photograph, Shipos
4 000221, what is that portraying?

5 A. My car.

6 Q. And what kind of car is it?

7 A. Maserati.

8 Q. What year?

9 A. I had just gotten it. It was a -- well, it
10 was 2016.

11 Q. And you say you had just gotten it.

12 When did you get it?

13 A. October 2000-- no. It's a 2017. So it would
14 have been October -- October 2016, sorry. Yeah.

15 Q. Was that car damaged as a result of the storm?

16 A. Yeah. It was totalled.

17 Q. The next picture?

18 A. This is my boyfriend's Audi.

19 Q. That's his car?

20 A. That's his car.

21 Q. Was that damaged as a result of the storm?

22 A. Yes. It was totalled.

23 Q. And next picture?

24 A. Same car. My boyfriend's car.

25 Q. Okay. I'd like you to look at some

1 photographs on the interior of your house.

2 A. Okay.

3 Q. The next photograph, 000230, what's portrayed
4 in that photograph?

5 A. This is my hallway. And I have an antique
6 hutch here in the entrance way.

7 Q. How deep was the water there, if you know?

8 A. I would say it's probably around at that time,
9 12 to 15 inches.

10 Q. Okay. And what do you base that on?

11 A. I think I just recall it being -- I think we
12 tried to mark all the watermarks on it.

13 Q. How long did it take the water to recede from
14 the interior of the house?

15 A. Six days.

16 Q. After the six days, do you remember seeing any
17 watermarks on the walls?

18 A. Yes.

19 Q. Was that all around the first floor?

20 A. Yes.

21 Q. And in the garage?

22 A. Yes.

23 Q. Did you have any watermarks in the exterior of
24 the house?

25 A. Yes.

1 things, what do you mean?

2 A. Well, the City, for one, since -- you know, we
3 flooded, I don't know why this is the case, but they
4 are -- basically, your electrical work that you have to
5 do, now has to meet -- as if it was a new construction.

6 So all my outlets aren't up to code yet.
7 So I still have to do that.

8 Q. Do they work, but they're not up to code?

9 A. They work, yeah. They work. But they are not
10 up to code. So like if I sell my house, there's still a
11 permit that's not closed on my house yet.

12 Q. Do you intend to up the electrical?

13 A. Well, I have to, yes.

14 Q. In order to sell the house?

15 A. Yes. I had an inspector out there twice, and
16 he's not passed it.

17 Q. Any idea how much that would cost?

18 A. I don't know, yet.

19 Q. Any other prospective costs?

20 A. Just -- I don't know. I just -- you just keep
21 running into it. I don't know.

22 Q. So right now and just generally --

23 A. I mean, you're just talking about cost, right?
24 You're not even talking about the depreciation of the
25 value of my house?

1 Q. Not yet. So the cost we have 190,000 that was
2 reimbursed by insurance?

3 A. Uh-huh.

4 Q. And that was for structural work?

5 A. Uh-huh.

6 Q. That is, furniture?

7 A. No. That doesn't include furniture.

8 Q. Did you ever -- did you purchase new
9 furniture?

10 A. I purchased -- everything is new in my house.

11 Q. Was that reimbursed with insurance?

12 A. It was reimbursed, but it was not replacement
13 cost.

14 Q. You only received depreciation cost?

15 A. Yes. And they depreciated significantly.

16 Q. As you explained before?

17 A. Yes.

18 Q. If you recall, what was the difference just
19 generally, in what you paid for new furniture versus how
20 much was reimbursed for depreciation?

21 A. Well, one, I'll never be able to replace what
22 I had.

23 Q. I see.

24 A. So I don't know that answer.

25 Q. Okay. And when you say you'll never be able

1 to replace it?

2 A. They were just unique pieces of furniture.

3 Q. I see. Had you purchased those here in
4 Houston?

5 A. I purchased some on the East Coast and some in
6 Houston, yes.

7 Q. The ones you purchased on the East Coast, you
8 brought those with you?

9 A. Yes. And I have rug that is -- I'll never be
10 able to replace either.

11 Q. With rugs that were the same?

12 A. Yes. Rugs that are the same, yes.

13 Q. You have replaced them?

14 A. I have replaced them, yes.

15 Q. The documents that would refer to what you
16 paid for things that you've bought to replace, did you
17 provide copies of those to your attorney?

18 A. I don't know if I have provided every
19 individual --

20 Q. Okay.

21 A. -- invoice or not.

22 Q. Did you -- did you save all your invoices?

23 A. I probably did not save all of them. I might
24 have the big-ticket items. But not all of them, no.

25 Q. Did you have any other costs -- did you incur

1 personal property losses?

2 A. I would say no.

3 Q. Do you think the insurance fully compensated
4 you for all the real estate losses?

5 A. No.

6 Q. Do you think it -- do you think, did the --
7 did the insurance compensate you for any of the
8 diminution of value of the property?

9 A. Definitely not.

10 MR. DOOHER: Object to the form.

11 BY MR. BANES:

12 Q. Now, when you were -- when you were buying the
13 house 22 years ago --

14 A. Yes.

15 Q. -- did the title search reveal that the Core
16 of Engineers had an easement to flow water through your
17 house?

18 A. Not that I'm aware of.

19 Q. All right. Did you ever hear that they had an
20 easement to do that?

21 A. No.

22 Q. Did the Core of Engineers knock on your door
23 one day and say, "We can -- we can put a river through
24 your house. And --"

25 MR. DOOHER: Object to the form.

1 BY MR. BANES:

2 Q. "-- and we're just letting you know that"?

3 A. No.

4 Q. All right.

5 Before this lawsuit, did you even know
6 they could do that?

7 A. No.

8 Q. And we haven't looked at any kind of easement
9 today, have we?

10 A. No.

11 Q. That would allow that?

12 A. No.

13 Q. Do you know generally about how much of your
14 savings you've had to use?

15 A. I think I mentioned probably out of pocket is
16 I'd say 50.

17 Q. 50,000?

18 A. Thousand.

19 Q. You said 50 to 60 earlier?

20 A. 50 to 60, yes.

21 Q. One last thing. Take a look at Exhibit 13,
22 ma'am.

23 A. Okay.

24 Q. This document at HCAD 2434, that's your
25 handwriting on this document?

1 A. Yes, it is.

2 Q. And Paragraph 5 -- now, when did you do this?

3 A. March --

4 Q. March 28th?

5 A. -- 28th.

6 Q. 2018?

7 A. Yeah.

8 Q. Paragraph 5, that's your view of what happened
9 to your house?

10 A. Yes.

11 Q. Now, with respect to the market values on
12 these appraisals or the appraised values, do you agree
13 with -- do you agree with the market value on this -- on
14 this -- on these sheets?

15 A. Between these two? Or --

16 Q. For any of them.

17 A. (Reading.) I don't know the answer to that.

18 Q. I notice that between 2016 and 2017, the land
19 value doesn't change at all?

20 A. Correct.

21 Q. Do you agree with that?

22 A. Not necessarily, but I don't know.

23 Q. Well, the property was flooded.

24 Was never flooded before 2017, was it?

25 A. No.

Peter Silverman

July 18, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF

9 PETER SILVERMAN

10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF PETER SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 9:06 a.m. to
16 3:52 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.
23
24
25

1 I was out of the country at the time and just got a call
2 that there had been a heavy rain.

3 Q. Okay. Has that sump pump been replaced?

4 A. It has.

5 Q. When was it replaced?

6 A. I don't know the date. I did it myself,
7 though, so I know it's been replaced.

8 Q. You installed the sump pump yourself?

9 A. No, I replaced it myself.

10 Q. Okay. You had a plumber install it?

11 A. Yes, it was installed as part of the system.

12 Q. Was that before or after Harvey?

13 A. Oh, no. I haven't touched it since Harvey.

14 Q. Okay. So do you think that -- just can you
15 give me a ballpark range from when you last replaced the
16 sump pump?

17 MR. HODGE: Objection; form.

18 A. It would be pure speculation. I really don't
19 know when it was.

20 Q. (BY MS. IZFAR) Okay. Other than these
21 additional four drains and the sump pump that you
22 installed around 1993 to '94, have you installed any
23 other drainage improvements?

24 A. No.

25 Q. Okay. Do you have any detention ponds on your

1 property?

2 A. No.

3 Q. Any -- have you ever done any foundation work?

4 A. No.

5 Q. Have you ever had any foundation damage?

6 A. Before Harvey there was -- there was no
7 foundation damage.

8 Q. So before Harvey you didn't have any cracks on
9 your sidewalk?

10 A. No. There were no cracks on the sidewalk.

11 Q. And did you have any cracks on your driveway?

12 A. We did. We had the driveway replaced since
13 we've owned the home as well.

14 Q. When was that?

15 A. Less than 20 years ago and more than 5 years
16 ago.

17 Q. Okay. And what prompted you to replace the
18 driveway?

19 A. The homeowners association came around and
20 myself, my neighbor to my right, my left, my neighbor
21 across the street, and next to them got letters saying
22 that our driveways needed to be repaired. And one of
23 the neighbors took it upon themselves to do it as a
24 project thinking that, if we did all of them at the same
25 time, we would save money. So they were all done at the

1 same time.

2 Q. Okay. And you testified earlier that there is
3 no location on your property where ponded water occurs
4 during a rainstorm, correct?

5 A. Well, I mean, during -- when it's raining,
6 there is -- it's wet. But as -- as soon as the rain
7 stops, there is no standing water on our property.

8 Q. Okay. Do you have downspouts?

9 A. I don't know what you mean.

10 Q. So you mentioned that you have a gutter line on
11 your house, right? The gutter line -- does the gutter
12 line flow into a tube that's attached to the side of
13 your home?

14 A. Yes.

15 Q. And then that -- and then that -- that -- will
16 that tube along the side of your house, I'm going to
17 call that a downspout, that flows onto the driveway,
18 correct?

19 A. No.

20 Q. Where does that water flow?

21 A. It's the opposite side of the driveway.

22 Q. Okay. Okay. Okay.

23 A. So if you look at Exhibit 3, it would flow into
24 what's called the ENC courtyard.

25 Q. Enclosed courtyard?

1 Q. Okay.

2 A. I know she was there the same day we were there
3 on the 9th because her company sent, like, a crew from
4 her company to help her. And they were there around the
5 same time. But I will also say that Janet's husband is
6 a City of Houston fireman, so it would not surprise me
7 if he got access before other people did since he's a --
8 a safety official or whatever you want to call it.

9 Q. Okay.

10 A. But we never -- I haven't talked to -- I mean,
11 we never talked about it.

12 Q. Okay. And you mentioned that Judy was in the
13 hospital during Harvey?

14 A. Yes. Yes.

15 Q. Okay. Do you know anything about the condition
16 of her home?

17 A. Yes.

18 Q. Was it flooded?

19 A. It was.

20 Q. Do you recall how much water she got?

21 A. I don't know how much water she got, but it
22 was -- it was -- it was flooded and they did not -- we
23 remediated and tore out everything in our house, and she
24 wasn't able to at the time until she got out of the
25 hospital and everything. So I felt badly for her.

1 Q. Do you know when she got out of the hospital?

2 A. Huh-uh. No. No, I'm sorry. I apologize. No,
3 I don't know. But --

4 Q. Okay.

5 A. But I don't know when she got out of the
6 hospital. But I have seen -- I did -- I was able to see
7 here post --

8 Q. Okay.

9 A. -- post-Harvey. So I know she is out of the
10 hospital. And she didn't have any place to go or place
11 to live, and it was sad.

12 Q. Yeah, that is very sad.

13 So the Garcias, you said they were living
14 at Katy in the time?

15 A. That's my understanding, yes.

16 Q. Okay. Do you know how much water they got?

17 A. No.

18 Q. Okay. So let's talk a little bit about the --
19 when you returned on the 8th. The first time you walked
20 into your home, what did you see?

21 A. It was surreal because things had moved to
22 places where they normally wouldn't be because they
23 floated -- they floated away. So a trash basket that
24 would have been in one room was tipped over in another
25 room. The -- the stench from the, you know, the --

1 that's not what I saw, that's what I smelled. But there
2 is a smell that flood has. I can't describe it in
3 general or specific. But just the smell of sewage and
4 the stench, like dead animals or anything like that.
5 I -- we didn't have masks or air or anything like that.
6 So the day we got in it was mainly just to try and take
7 things out of the freezer and the food and throw it away
8 so it wouldn't smell -- smell worse and to try and get
9 some clothes to wear and things like that.

10 But there was already mold covering the
11 walls. And we knew from everything that we had heard
12 that it wasn't safe for us to be inside of there. But I
13 wanted -- we had -- I wanted to open up windows and
14 everything like that to try and get fresh air into the
15 house to help -- to help with that.

16 Q. When you say "we," who were you with?

17 A. I was with my wife and I believe a coworker of
18 hers, her secretary -- or I'll get in trouble for that.
19 Maybe her legal professional -- what's it called?

20 MRS. SILVERMAN: LPA.

21 A. Her legal practice assistant.

22 Q. (BY MS. IZFAR) What's her name?

23 A. Carol Tamez, T-A-M-E-Z.

24 Q. All right. Was there still standing water in
25 the house?

1 A. It was wet still but there wasn't -- there was
2 not water throughout the house.

3 Q. And on September 8th?

4 A. On September 8th there was not water. We were
5 able to walk into the house, but it was still -- it was
6 still wet.

7 Q. Okay.

8 A. And especially carpeted areas and the
9 padding were --

10 Q. Right.

11 A. -- completely squishy and wet.

12 Q. Do you remember -- or do you have any idea of
13 when the water may have receded?

14 A. No. I really -- I don't. I would -- I say
15 this and not to be helpful, but my guess is as soon
16 as -- as soon as the streets were able to drain, the
17 water drained out of my home as well.

18 Q. Do you know when the streets were able to
19 drain?

20 A. No. And some of them were still underwater
21 even at that time coming into ours, but ours was not.

22 Q. When you say some streets were underwater
23 around September 8th when you came in --

24 A. Yes.

25 Q. -- can you identify any of those streets?

1 A. No, not by name. In general, one of the joys
2 of living where we did is we lived in the high area of
3 the neighborhood because we were near the Buffalo Bayou
4 and things flowed away from us. So once the water came
5 out, it didn't stay in our street. It flowed down to
6 the -- I hate this direction stuff -- it would flow to
7 the south towards Briar Forest, which is a main street.
8 I know you don't live -- well, you know Briar Forest.

9 Q. I know Briar Forest.

10 A. It would flow south towards Briar Forest, not
11 north towards Memorial.

12 Q. Right. So it would -- the water would flow
13 both east and south. So kind of southeast?

14 A. I don't know if it was -- I don't know if
15 that's fair to say. I really don't know anything about
16 hydrology. But Buffalo Bayou flows east-west and we
17 live on the south side of Buffalo Bayou. So if it
18 overflowed, it would have flowed south. So the bayou
19 itself is east/west, and since we live south of it, it
20 would flow south.

21 Q. So when you say "east/west," you mean --

22 A. I'm sorry west/east.

23 Q. -- west/east?

24 A. I apologize.

25 Q. Right. Okay. Yeah, no.

1 on the east side of his house than the west side of his
2 house. So the water flowed on the east side, not the
3 west side.

4 Q. Why is there less resistance on the west side
5 of his house?

6 A. Because, A, the water was coming from the west
7 so it would hit east first. And, B, I would -- my
8 assumption would be that the elevation is lower on the
9 east side than the west side, both of those things. So
10 the water is flowing east -- I'm sorry. The water is
11 flowing west to east, so it would come to the east side
12 before it came -- it would come -- it was flowing west
13 to east, so it would come to the west side before the
14 east side. So there would be more water on the west
15 side than the east side would be one reason. And the
16 second reason that I would think is because of the
17 elevations.

18 Q. Okay. Putting the pictures aside, I just have
19 a few questions. So you previously testified that you
20 weren't in your home until September 8th. Just to
21 confirm, do you have any indication as to how long it
22 took for the water to recede?

23 A. I have no personal knowledge of -- of what --
24 of how long it took to recede.

25 Q. Do any of your neighbors have any knowledge?

1 A. I don't know. I don't know. When we were able
2 to get back in on the 8th and then the 9th, that
3 appeared to be the first time that anyone was able to
4 come in. So I don't know of anyone who stayed in their
5 house during this event who I would even be able to ask
6 that.

7 Q. You mentioned earlier that Nick visited the
8 area on August 31st -- August 30th and August 31st?

9 A. Yes, I believe that to be the case, that he
10 visited both days.

11 Q. Do you know when he visited next after
12 August 31st?

13 A. I do not know when he visited after the 31st
14 or when he ultimately moved back into his house.

15 Q. Okay. You have not moved back into your home?

16 A. Correct.

17 Q. Why is that?

18 A. Because it was destroyed in the flood and has
19 not been rebuilt.

20 Q. Have you taken any remediation steps?

21 A. Yes.

22 Q. What steps? Can you walk me through all of the
23 steps that you've taken?

24 A. As soon as we can, we removed all of the wet
25 carpeting and anything that -- furniture, clothing,

1 anything that had the ability to hold mold spores and
2 the like. And we hired a contractor to come in to
3 finish demo remediation and paid him \$5,000, and he came
4 in and sprayed all the surfaces with an alcohol
5 substance to kill the mold before he would let people go
6 inside the house. And then 24 hours or so later, they
7 came in with a crew and a tractor and removed the
8 bathrooms, the kitchen, and the Sheetrock, the doors,
9 the trim, the moldings, the cabinets under 4 feet high,
10 anything built-in like that.

11 Q. And when did this take place?

12 A. The -- the week following -- the week of
13 September 10th. I don't know exactly what days were the
14 spray days and what days were the construction days.
15 But that's my recollection, that we hired him and he
16 came -- he came that week. It may have been plus or
17 minus a day. But it was -- it was either that week or
18 shortly thereafter, maybe the 18th or so. But
19 sometime -- sometime in the middle of September.

20 Q. So after you finished all of the mold
21 remediation and demo work, did you take any other
22 remediation steps?

23 A. I turned off the water to the house.

24 Q. Why did you do that?

25 A. It seemed like the right thing to do since no

1 one was living there.

2 Q. Did you intend to return to your home?

3 A. We -- we hoped. We love our street. We live
4 in the best street in Ashford Forest. And we love the
5 neighborhood and we love that part of town. My wife
6 especially does not want to live far from the church she
7 attends. And so we tried to think of ways where we
8 could live on that property again. We'd be happy to.

9 Q. Are you taking any other steps to remediate the
10 home to prepare it for habitation?

11 A. I've pretty much decided that we can't live
12 there without finishing -- demolishing it and then
13 building something new there. And I'm in the thought
14 process right now, if someone else wants to buy the
15 property, that that may be an alternative way for us to
16 go and perhaps will allow us to move on more easily from
17 this.

18 Q. When you say that you've come to the conclusion
19 that you can't live there until -- unless you demolish
20 it and rebuild, can you walk me through that thought
21 process?

22 A. It was the perfect house for a family of four
23 to raise children in in a perfect block. But now as a
24 couple with grown children either in college or
25 graduated from college, we'd look for things like an

1 22 houses and maybe additional 12 houses on the
2 north/south side.

3 Q. Okay. And do you have an estimate as to how
4 many are still vacant?

5 A. I don't have an estimate, no.

6 Q. So you previously testified that you thought
7 that your street was one of the prettiest streets -- and
8 I'm paraphrasing -- or one of the best streets. Is that
9 still your opinion?

10 A. Those are two different things, right? So to
11 this day I think it's probably the most beautiful street
12 you could possibly live on, but it's the saddest street
13 in the neighborhood still. So it's still -- it's a very
14 sad street.

15 Q. Are any of the other streets in Ashford Forest
16 vacant the way Westerley is?

17 A. Not that I've been on, no. It really seems to
18 be the hardest hit block in the subdivision.

19 Q. Do you have an -- do you have a guess as to why
20 it was the hardest hit?

21 MR. HODGE: Objection; form. Calls for
22 speculation.

23 A. My guess is because it runs along the same
24 trajectory as the bayou, which overflowed during the
25 releases and damaged the homes.

1 Q. (BY MS. IZFAR) Do you -- what is it about
2 Westerley Lane that made it the prettiest street?

3 A. It doesn't go anywhere. So the only people
4 driving on the street are the people who live on that
5 street, so you knew every car that went by. The -- the
6 houses are set further back off the street, and the
7 trees and the animals and the greenery are unsurpassed
8 in any other street in the neighborhood.

9 Additionally, I think the lots are probably
10 bigger than the other streets in the neighborhood. You
11 have -- to get to it, you have to deliberately make
12 three turns to get to that one street. And so there is
13 no trucks; there is no noise. It was just a beautiful
14 street.

15 Q. Turning back to the repairs, I just want to
16 make sure that I got all of the information on this. So
17 you described that you had done some demolition work,
18 and then you had gutted the home down to its studs,
19 right?

20 A. 4 -- 4 feet of Sheetrock and then all of the
21 bathrooms and kitchen. And I'll add -- I didn't say, I
22 also cut off the gas for the same reason as the water.
23 It didn't -- since the appliances were all disconnected
24 and everything, it didn't seem responsible to have live
25 gas running to the house without anyone living there

1 without any appliances hooked to it. But I did leave
2 the electricity on.

3 Q. Uh-huh. Okay. And other than that, did you do
4 anything -- any other repairs to the home?

5 A. No.

6 Q. Okay.

7 A. We pay for a yardman to come and keep up the
8 outside. I don't know if you consider that a repair or
9 not necessarily. But we don't want to -- we don't want
10 people to feel like they're living in an unkempt place.

11 Q. Have you thought about putting the home up for
12 sale?

13 A. We -- we've discussed it, and we've spoken
14 to -- only to two people. We've never put it on any MLS
15 listing. But the guy who bought Judy's house, we
16 discussed it with. And another guy we recently
17 discussed it with as well.

18 Q. Who was the guy that bought Judy's house?

19 A. His name is Randy. And I believe the last name
20 is Milkovisch.

21 Q. Okay. I think I've got an e-mail from him. So
22 I'm going to mark this as Exhibit No. 18. It's an
23 e-mail that you sent to yourself but that also lists --
24 identifies an e-mail that, I think, Randy Milkovisch
25 sent to you on January 29th, 2018. And it's

1 Bates-stamped Silverman 000593.

2 (Exhibit 18 marked.)

3 Q. Is this Randy Milkovisch the person who bought
4 Judy's home?

5 A. He is.

6 Q. Okay. And were you e-mailing him about selling
7 your home?

8 A. I had called him and then sent him an e-mail,
9 "Let me know if interested. Patio door is open."

10 Since he was working on the house. And
11 then he sort of walked through this and asked me a
12 question, and we responded.

13 Q. So on January 29th at 12:42, it seems like he
14 wrote, "Good afternoon. I walked the house last week.
15 I have several questions, but before we get too far into
16 them, what were you expecting to get from the house
17 as-is?"

18 A. Correct.

19 Q. And you wrote back on that same day at
20 1:30 p.m. And you said "I haven't shopped the market
21 fully but would ask 200,000 if listing it. What are
22 your thoughts?"

23 And then he wrote back a few paragraphs
24 saying that he -- "I paid about \$63 per square foot next
25 door and it needed to be demoed still. I shopped her

Zhennia Silverman

July 18, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF

9 ZHENNIA SILVERMAN

10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF ZHENNIA SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 4:05 p.m. to
16 5:34 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.
23
24
25

1 Q. And do you agree with his assessment that you
2 are still in a place where you're deciding whether to
3 renovate and move back or sell your house?

4 A. We -- I think ideally we would -- I mean, I
5 love my neighborhood and I would love to rebuild and
6 we've talked about it. But my husband's currently
7 unemployed, and so it's very hard for us to take on a
8 mortgage at this point and, you know, redo our home the
9 way that we want it. I mean, we just, you know, we need
10 a little bit more financial stability I think before we
11 can make that type of commitment. And we have looked
12 for houses but, you know, they're -- I mean, our lots
13 were big. You know, everything now is just like these
14 little cookie-cutter houses and they all look the same
15 and it's -- so anyway...

16 Q. So have you gotten estimates from contractors
17 as to how much it would cost to rebuild the home?

18 A. I think my husband had talked to somebody at
19 one point. And the only thing I remember from that
20 conversation was that it was a lot more per square foot
21 than we were willing to commit to at the time.

22 Q. And then -- so do you have any plans to move
23 out of your current home?

24 A. You know, I would love to move out of our
25 current home -- I mean out of our current apartment.

1 But as I mentioned earlier, I really hate house hunting.
2 And so it's sort of a little bit of a safe haven for us
3 right now. And it -- I mean, we definitely will have to
4 move out at some point. Our apartment lease is up in
5 September and I don't know if we'll renew for another
6 year or not.

7 Q. So of the money that you've received from FEMA,
8 do you have an understanding of how much is left for
9 repairs?

10 A. It is my understanding that we have not touched
11 very much of that, if anything at all. I think the
12 large check that we got, my husband sent it to the bank
13 or to whoever holds our mortgage. We have used some for
14 living expenses, but I mean, I think we -- we still
15 have, you know, a bit of it.

16 Q. Okay.

17 A. But I will also tell you that I don't deal with
18 the finances, so...

19 Q. Understood. Do you -- do you agree with your
20 husband's testimony as to the remediation work that was
21 done?

22 A. Yes. I know that we paid \$5,000. And I
23 thought we had paid extra for the mold or whatever it is
24 that they sprayed, but maybe not. So I think it's
25 5,000. I thought it was a little bit more than 5,000,

1 but I'm sure we produced that receipt.

2 Q. Okay. And if you were to rebuild right now, is
3 there any sort of obstacle preventing you from
4 rebuilding?

5 A. I mean, other than paying for it and figuring
6 out where we're going to stay while it happens, no. I
7 mean, I'm a creature, I guess, of habit. And so ideally
8 I would love to, you know -- you know, stay in the area.

9 Q. Right. But you don't know of any contractor
10 shortages or anything like that that would prevent you
11 from rebuilding?

12 A. You know what, I hear horror stories every day
13 because I know a lot of people that have been affected
14 in the Katy area and near us. And so, I mean, you know,
15 I hear -- you know, I mean, people talk about it at work
16 all the time. Just -- there's a door shortage or, you
17 know, my contractor, you know, disappeared. Or I can't
18 get cabinets installed. So that to me is very scary to
19 have to deal with that.

20 Q. Okay. And in terms of the money that you
21 received from FEMA, do you have any understanding as to
22 whether that is sufficient for you to fully repair your
23 home?

24 A. I wouldn't think so, no.

25 Q. Okay. But do you have any estimates that are

1 higher than that amount?

2 A. We haven't gotten any estimates to repair our
3 home. But just -- I mean, yeah. I mean, I know that
4 that's, you know...

5 Q. When is the last time you visited your home?

6 A. I think I go back to the house more than my
7 husband does, sometimes for like a gardening supply or
8 something. It's very depressing to go back and so
9 nobody wants to go back. But sometimes our gardener
10 will leave his invoice somewhere and then I'll go and
11 pick that up. But I've probably been in the last month.

12 Q. Okay. And he mentioned that you guys cut the
13 power -- or the water and the gas?

14 A. Water and gas. Because initially we left the
15 electricity on because we had it full blast to sort of
16 help dry out the house.

17 Q. Okay. Do you still have electricity there?

18 A. Uh-huh. I think so, yes.

19 Q. And it's still running?

20 A. Yes. I believe the only thing that my husband
21 cut off was the water and the gas.

22 Q. Okay. Is there any -- since you've treated it
23 for mold, is there evidence of mold there?

24 A. I don't normally walk through the house.

25 Q. Okay.

Timothy Stahl

September 5, 2018

Page 1

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM)
ADDICKS AND BARKER) Sub-Master Docket
(TEXAS) FLOOD-CONTROL) No. 17-cv-9002L
RESERVOIRS)

ORAL DEPOSITION OF
TIMOTHY STAHL
SEPTEMBER 5, 2018

ORAL DEPOSITION of TIMOTHY STAHL, produced as a witness at the instance of the Defendant, and duly sworn, was taken in the above-styled and numbered cause on September 5, 2018, from 10:10 a.m. to 2:52 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of NEEL, HOOPER & BANES, P.C., 1800 West Loop South, Suite 1750, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

1 later, but you can set it aside for now.

2 A. Yes, ma'am.

3 Q. And then let me just ask you a couple
4 questions about the third document that we received
5 this morning and that we've marked as deposition
6 Exhibit 4. Can you identify this for me, Mr. Stahl?

7 A. Yes, I can.

8 Q. And what is it?

9 A. This is the third-party appraiser for USAA
10 who came out 20 grand under what it would actually
11 cost to repair the property.

12 Q. And 20 grand under, is that by comparison to
13 the estimate you got from Home Remedy?

14 A. Yes.

15 Q. Okay. All right.

16 A. To the people who are actually interested
17 enough to do the work.

18 Q. Okay. And it looks like this particular
19 report is dated at the top, February 16th, 2018; is
20 that correct?

21 A. Yes, ma'am.

22 Q. And has your -- has your flood insurance paid
23 out any amount identified in this report?

24 A. They have.

25 Q. Okay. How much did they pay out?

1 A. Exactly what's identified in this report,
2 27,681.66.

3 Q. Okay. I just want to make sure I've got the
4 right number.

5 A. Maybe it was 27,209. That's possible. It
6 was right around \$27,000 is what they paid out total.

7 Q. Okay. On the second page, the bottom
8 number --

9 A. Yeah. The net claim recovered. I apologize.

10 Q. Okay.

11 A. So 27,209.80.

12 Q. That's the amount the flood insurance paid to
13 you?

14 A. Yeah. It was right around \$27,000.

15 Q. Okay.

16 A. So I'd go with that number.

17 Q. Okay. All right. And when did they pay out
18 that amount to you?

19 A. Well, they paid it out in portions. The
20 first check was for \$10,000, which Ocwen, my mortgage
21 company who had the lien on the house, signed on
22 fairly quickly. The second check was much later down
23 the road for \$17,000. Ocwen had a laundry list of
24 things that they needed from a contractor who would do
25 the work. The last thing on that list was a release

1 of lien or waiver of lien. So the contractor --
2 normally if a contractor doesn't get paid, they put a
3 mechanics lien on the property. What Ocwen was asking
4 was a contractor to waive their ability to put a
5 mechanic's lien on the property prior to getting a
6 penny, and every contractor I talked to just laughed.
7 There was a contractor who came in, and when he heard
8 I was dealing with Ocwen as my mortgage company, he
9 turned around and walked out. Nobody likes Ocwen.

10 Q. So how did you end up dealing with that
11 situation?

12 A. I had to sell the house. I had to pay off
13 the note with Ocwen in order to have the check
14 reissued by USAA, minus the Ocwen signatory.

15 Q. And was the insurance company willing to do
16 that after you sold the house?

17 A. They did, because I'm still the lienholder on
18 the house. I still own it.

19 Q. Okay. All right. I'm going to come back,
20 and we'll kind of walk through your sale of the
21 property, but before we do that and before I get too
22 far ahead of myself, I want to come back and just talk
23 a little more about your background and purchase of
24 the property and then we'll walk up chronologically to
25 that.

1 conditioner was located.

2 A. Yes, sir.

3 Q. Is the air conditioner below the -- below the
4 flood -- flood point of the lower deck?

5 A. The air conditioner's location in relation to
6 the property is below the house, below the deck by
7 about 8 to 10 feet.

8 Q. Okay.

9 A. The -- where the deck meets the house --
10 because, again, there -- it's that odd pier-and-beam
11 thing. So that's elevated from the -- the grade of
12 the dirt. It's about an 8 to 10-foot difference from
13 the base of the air-conditioning unit to the base of
14 the deck, the bottom. Not the top of the decking, but
15 the bottom of the structure.

16 Q. Okay. So after hitting the air conditioner,
17 water would have to come up about 8 or 10 feet more
18 before it even started entering the house?

19 A. That would be correct. Entering the bottom
20 of the house.

21 Q. Entering the bottom of the house. And
22 then -- all right. A couple more questions. Did you
23 ever have -- I mean, did you -- did you ever have
24 occasion to investigate, like, the market value of the
25 house before Harvey?

1 A. To try and argue with HCAD to keep the price
2 down.

3 Q. Well, but in terms of, like, what the
4 property would sell for and what HCAD thinks it is,
5 those might be two different things, aren't they?

6 A. Yeah. And the neighbors both sold about --
7 in 2016, the neighbor at 263 sold, in 2016, for a
8 little over a million dollars. The neighbor at 267
9 sold for about 550.

10 Q. Okay. So is your house comparable to either
11 one of those?

12 A. It's very comparable to the one that sold at
13 550. It's a thousand square feet smaller, but
14 otherwise, it was built by the same architect at the
15 same time on the same -- I mean, roughly the same
16 dirt. It's literally right next to it.

17 Q. Now, we were looking at -- at one point, Ms.
18 Tardiff showed you Exhibit 23.

19 A. Hold on. Let me get to it.

20 Q. It's the last exhibits, I think.

21 A. Okay. Got it.

22 Q. Now, Exhibit -- now, from your perspective,
23 what makes Exhibit 23 so interesting with respect to
24 where your property is located?

25 A. It was close to the Spring Creek and Buffalo

1 Bayou.

2 Q. Now, did HCAD actually carve out a separate
3 area for these three houses?

4 A. As a matter of fact, they did.

5 Q. Now, why did they do that?

6 A. In 1968 -- actually, a little before that,
7 when they were building out the rest of the
8 neighborhood, the builders that were on that
9 neighborhood, they said that that particular lot was
10 unbuildable due to grade. They liked building on flat
11 dirt, and this didn't have flat dirt so they left it.
12 This architect who was right out of Rice Architecture
13 School said, "I know how to build on that." So he
14 built three houses on that one lot. But the Huntley
15 subdivision said you don't conform to our
16 single-family notion of a house, so we don't want you
17 as part of our neighborhood, and HCAD said, well, we
18 have to tax you so you have to be your own
19 neighborhood, because nobody else will touch it. So
20 it became its own neighborhood, three houses.

21 Q. Okay. Is the house -- an architect kind of
22 built this right out of Rice Architecture School?

23 A. Yes, sir, he did.

24 Q. Did he use just standard materials?

25 A. Well, standard as in concrete and wood?

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE: DOWNSTREAM *

ADDICKS AND BARKER *

3 (TEXAS) FLOOD CONTROL *

RESERVOIRS * SUB-MASTER DOCKET NO.

4 * 17-cv-9002L

5 THIS DOCUMENT RELATES TO:*

6 ALL DOWNSTREAM CASES *

7 *****

8 ORAL DEPOSITION OF DUTCH CHRISTOPHER LINDEBURG

9 VOLUME 1

10 SEPTEMBER 26, 2018

11 *****

12 ORAL DEPOSITION of DUTCH CHRISTOPHER LINDEBURG,
13 produced as a witness at the instance of the United
14 States, and duly sworn, was taken in the above-styled
15 and numbered cause on September 26, 2018, from 4:19
16 p.m. to 6:14 p.m., before Carol Jenkins, CSR, RPR,
17 CRR, in and for the State of Texas, reported by
18 machine shorthand, at the Potts Law Firm, 3737 Buffalo
19 Speedway, Suite 1900, Houston, Texas 77098, pursuant
20 to notice and the Federal Rules of Civil Procedure.
21
22

1 and I looked at it. I'm sure. Just knowing -- I
2 mean, I know the property.

3 Q. Right.

4 A. Water can be down there. This isn't our
5 first -- we've had rain here before, so...

6 Q. And I believe you then said you returned much
7 later on the 27th. Did I get that right?

8 A. Let me see here. Click out on that. Let me
9 get back in. Uh-huh.

10 Q. Is that a "yes"?

11 A. Yes. I'm sorry. Yes.

12 Q. And did you return again on the 28th?

13 A. Yes.

14 Q. Do you remember what time of day that was,
15 approximately?

16 A. That would be in the morning, I believe.
17 Yeah, in the morning, around 10:30-ish probably.
18 10:30 a.m.

19 Q. 10:30 a.m.?

20 A. Let me double-check.

21 Q. Okay.

22 A. Planet Funk. Yeah.

1 Q. You said yes?

2 A. I'm sorry. Yes.

3 Q. You believe you returned on the 27th?

4 A. I was there on the 27th in the afternoon and
5 I was there on the 28th in the actual daylight morning
6 and then I was there again on the 29th at the wee
7 hours of the morning around 2:00.

8 Q. Okay. What do you recall about the water
9 levels in the house over that period of time? Did
10 they stay the same? Did they get worse? Did they get
11 better?

12 A. The water levels increased from the morning
13 of the 28th to the wee hour morning of the 29th, it
14 came up probably at least a foot and a half.

15 Q. And that was based on -- what did you see?

16 A. Well, it spilled into the stairwell because
17 when the water butts up to the parking area and the
18 shrubs, the next -- if it comes any further in and up,
19 it has a little bit of a step, about a foot step that
20 needs to come up to come into the basement --

21 Q. Okay.

22 A. -- or the first floor as y'all call it I

1 guess.

2 Q. Okay.

3 A. So when I came back early in the morning, it
4 had come into the basement.

5 Q. On which date?

6 A. That would be early, early morning on the
7 29th, the 2:00 a.m.

8 Q. Okay.

9 A. So from when I went there in the morning of
10 the 28th at 10:30 a.m. and then came back at 2:00 a.m.
11 on the 29th, the water had risen at least a foot and a
12 half.

13 Q. All right. And did you store any property in
14 the first floor yourself?

15 A. Yeah.

16 Q. What did you store down there?

17 A. I don't know. What did I have? I had set
18 design stuff that was left over from Death Trap. I
19 had smoke machines, wardrobe, vacuum, shop vac, I
20 don't know, powder gun. Yeah. We had all sorts of
21 old props, too, like from Blimp Trap. Like old timey
22 dial phones like the ringer phones, old typewriter,

1 just cool prop stuff.

2 Q. And just to be clear, do we know, if you can
3 remember, the first date and time that you actually
4 entered the property, went inside and were in the
5 first floor and could see the flooding, what date of
6 all the visits, which date and time did that occur at?

7 A. I had gone in pretty much every visit. Every
8 time I'd go there, I'd do a walk through for the most
9 part.

10 Q. Okay.

11 A. I don't go through Shawn's personal area or
12 office or anything like that, but I go through -- I
13 usually go through the downstairs and walk just
14 basically do an under walk, check on the pig, throw a
15 stick for the dogs and lock the back door.

16 Q. Okay. All right. And do you remember during
17 the visits to the first floor on the 28th and 29th
18 seeing what it looked like with respect to the props
19 and art and other things on the first floor?

20 A. Uh-huh.

21 Q. What did it look like?

22 Is that "yes"?

1 A. I'm sorry. Yes.

2 Q. What did it look like with respect to the
3 property that was in that room?

4 A. At what time?

5 Q. On the 28th and 29th.

6 A. It was okay prior to -- I mean, it was okay
7 on the daytime visit it was okay and the early morning
8 visit was not.

9 Q. Okay. Was the property -- was it floating in
10 the water?

11 A. Yeah, the whole thing, it was water world,
12 so...

13 Q. Okay. And then how long did the water stay
14 like that?

15 A. God, I don't know. Arturo had to pump it
16 out.

17 Q. Who is Arturo?

18 A. He's the family handyman, gardener. He mows
19 the grass, you know, does that kind of stuff.

20 Q. Okay.

21 MR. DAIN: Off the record.

22 (Discussion held off the record.)

1 MR. POTTS: I don't have any further
2 questions.

3 MR. DAIN: I just have one question to
4 follow-up.

5 FURTHER EXAMINATION

6 BY MR. DAIN:

7 Q. For the visit on the 29th, is that the
8 deepest you ever saw the water?

9 A. That is the deepest I saw it, yes.

10 Q. How deep was it off the floor of the basement
11 or the first floor?

12 A. I mean, it came over the doorjamb because
13 there's loading doors in the back that go to kind of a
14 ramp that lead to the parking lot and so, I mean,
15 Shawn -- I sent Shawn a picture of it. So we should
16 be able to tell from that.

17 Q. Okay.

18 A. Maybe, I mean. I think that phone got
19 destroyed. I can't seem to find that one. Maybe it's
20 on Facebook. I don't know.

21 Q. Let me just --

22 MR. POTTS: Look at this. Is this it?

Mr. Shawn F. Welling

August 14, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE: DOWNSTREAM §

 ADDICKS AND BARKER (TEXAS) §

3 FLOOD-CONTROL RESERVOIRS §

4 vs. § SUB-MASTER DOCKET NO.

5 _____ § 17-cv-9002L

6 THIS DOCUMENT RELATES TO: §

7 ALL DOWNSTREAM CASES §

 _____ §

8
9 ORAL DEPOSITION

10 MR. SHAWN S. WELLING

11 August 14, 2018

12
13 ORAL DEPOSITION OF MR. SHAWN S. WELLING,
14 produced as a witness at the instance of the United
15 States and duly sworn, was taken in the above-styled
16 and numbered cause on the 14th day of August, 2018,
17 from 9:22 a.m. to 3:52 p.m., before Michelle Hartman,
18 Certified Shorthand Reporter in and for the State of
19 Texas and Registered Professional Reporter, reported
20 by computerized stenotype machine at the offices of
21 Potts Law Firm, 3737 Buffalo Speedway, Suite 1900,
22 Houston, Texas 77098, pursuant to the Federal Rules
23 of Civil Procedure and the provisions stated on the
24
25 record or attached hereto.

Mr. Shawn F. Welling

August 14, 2018

<p style="text-align: right;">Page 146</p> <p>1 A. That is another place like this, not 2 quite as tall of a ceiling. 3 Q. Storage space, electrical? 4 A. Kind of a little storage area. But I 5 don't like storage stuff. But yeah, stuff was stored 6 there, they get stored there, but yeah, storage. 7 Q. Okay. And in the area that's reflected 8 in there where the "W" is where you have the door, at 9 that point you are no longer within four walls, 10 right? 11 A. Yes, you are. 12 Q. This (indicates)? 13 A. Oh, here (indicates)? 14 Q. That spot right there. 15 A. No, that's open, open. 16 Q. Okay. Open. Could you just write the 17 word "open" there? 18 A. Yeah (Complies.) 19 Q. Okay. Thank you. 20 A. So this is -- this right here is "Y." 21 Q. Okay. So you were just -- you were -- 22 you're now on the Welling office page? 23 A. Yeah. This is what's underneath this 24 floor. If you're underneath this floor, you're here 25 (indicates.)</p>	<p style="text-align: right;">Page 148</p> <p>1 pacifier, some Clorox. I think they use Clorox to 2 wash the walls and then repaint it. 3 Q. And is that what -- so to date, was 4 that the work that's been performed on the walls: 5 Cleaning, Cloroxing, painting? 6 A. Yeah, just a Band-Aid. To get it done 7 right would -- that's another question. I could 8 answer that, but that's another question. 9 Q. And wood beams, has -- has any work 10 been performed on wood beams? It's just something 11 you stated earlier. 12 A. Yeah, it's over here. Under this area 13 (indicates,) there are some wood beams, a lot of 14 two-by-four structural walls that were there that all 15 got wiped out. And then these major supporting beams 16 were simply bricks for, like, old houses. This is 17 19 -- what is it, 1923? So there are actual support 18 bricks that are brick, brick, brick. Who knows 19 what's in the center, it could be cement that holds 20 up this old house. 21 I should refrain from saying that. 22 They were two-by -- they weren't supporting beams. 23 So they were beams because if you look at them and 24 they are wood two-by-sixes or two-by-fours. 25 Q. Are you now talking about items that</p>
<p style="text-align: right;">Page 147</p> <p>1 Q. Okay. So on the Welling office page 2 you did a "Y" and that matches up to where the "Y" is 3 on the downstairs page? 4 A. It is -- all of this is -- all of this 5 is walk space, (indicates) underneath. And then 6 right here it starts to slope up and get a little 7 crazy (indicates) under. 8 Q. Okay. Understood. 9 A. Understood? 10 Q. So for the floor, the work that was 11 performed was the dirt was removed? 12 A. Yeah. Some dirt, not all of it, not as 13 much as needs to be, but we got some out. 14 Q. Have you painted the floor since that 15 time? 16 A. I know all the walls were painted, and 17 I know they were pulling up the old gloopey (ph) 18 stuff that was crackling up. I don't know if we got 19 all the way finished. 20 Q. So for the walls, were the walls -- 21 A. Completely, yeah. I don't know to the 22 level. I do know that some sort of -- I can call the 23 guy right now, but I know that something was used on 24 the walls to help the mold. It wasn't like high 25 professional stuff, but something just to -- as a</p>	<p style="text-align: right;">Page 149</p> <p>1 are in the outside area -- 2 A. Underneath the house. 3 Q. -- underneath the house in the -- in 4 the -- but not enclosed by four walls? 5 A. Yes, enclosed. So this right here is 6 enclosed (indicates,) and there's another door that 7 goes under here (indicates) that's enclosed. 8 And then this is walkable, I can stand 9 up. And if you go up here (indicates,) it starts to 10 slope and that's where it gets crawl spacy up here. 11 But this right here, this structural 12 wall -- and I am not talking about this one but the 13 one underneath -- was held up by two-by-fours and 14 maybe two-by-sixes, but they were all two-by-fours, 15 they all got taken out and then we looked at the 16 actual supporting beams. Those weren't really beams. 17 Those were just the cement bricks that were holding 18 that -- 19 Q. And that work was all was performed 20 within an area that was within four walls? 21 A. That's correct. 22 Q. Okay. And so would that area be the 23 area that you designated within "Y" on the -- 24 A. That's "Y." This could be "Z." 25 Because there is another --</p>

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Mr. Shawn F. Welling

August 14, 2018

Page 150	Page 152
<p>1 Can I write here?</p> <p>2 Q. Go ahead, right there, (indicates.)</p> <p>3 A. (Complies.) There is another door and</p> <p>4 this would be "Z."</p> <p>5 Q. And now you're on the Welling office</p> <p>6 page and you're marking a "Z"?</p> <p>7 A. Yeah. Which is "Z" over here, which</p> <p>8 means there is a "Z" that way over here (indicates.)</p> <p>9 Q. And so you made it -- also made a "Z"</p> <p>10 on the first-floor level?</p> <p>11 A. Yeah.</p> <p>12 Q. Okay. Do you have a total cost that</p> <p>13 you have incurred for those repairs to date?</p> <p>14 A. I would say I can give you an estimate.</p> <p>15 Q. Give me an estimate.</p> <p>16 A. Let me see, that was -- I would</p> <p>17 say one, two three -- I would say \$100,000 on the</p> <p>18 Band-Aid.</p> <p>19 Q. Have you listed all the work that has</p> <p>20 been performed for that \$100,000?</p> <p>21 A. With you right now, no. There's still</p> <p>22 more work that was done.</p> <p>23 Q. What else -- what other material work</p> <p>24 was done, significant work?</p> <p>25 A. The fence -- whole back line fence was</p>	<p>1 Q. What about air conditioning units?</p> <p>2 A. I haven't put it back in yet.</p> <p>3 Q. Say again.</p> <p>4 A. I haven't put it back in yet.</p> <p>5 Q. Okay. Were the air conditioning units</p> <p>6 damaged?</p> <p>7 A. Yeah, there were multiple ones damaged.</p> <p>8 One, two, three. My total AC bill is maybe 30 grand.</p> <p>9 And the replacement was J.C. Blower. I think that's</p> <p>10 who did those.</p> <p>11 Q. So I'm not sure what you're telling me</p> <p>12 about the status of the air conditioner repair.</p> <p>13 A. The one in this room was not replaced</p> <p>14 (indicates).</p> <p>15 Q. Have you replaced -- let's start with</p> <p>16 the ones that you have replaced.</p> <p>17 A. Yeah.</p> <p>18 Q. What have you replaced for air</p> <p>19 conditioning?</p> <p>20 A. Three five-ton units and two three-ton</p> <p>21 units.</p> <p>22 Q. And what do you think was damaged that</p> <p>23 hasn't been replaced?</p> <p>24 A. The one down here (indicates) has not</p> <p>25 been replaced in the basement.</p>
Page 151	Page 153
<p>1 under water for four days and it was completely</p> <p>2 "pfft" (ph.) So that was redone.</p> <p>3 And then the stairwell up to the</p> <p>4 balcony was redone. New railings were all put in.</p> <p>5 And let's see, what else. Everything was repainted</p> <p>6 from the first level, including the fences and the</p> <p>7 building itself inside. All that was under water.</p> <p>8 I am only incorporating what was</p> <p>9 actually under water. The -- and then of course I</p> <p>10 got -- received -- received completely new plants.</p> <p>11 All the plants had been taken out and maybe at least</p> <p>12 close to 25,000 worth of yard rework, which is not</p> <p>13 limited to lots of things getting cut down and trees</p> <p>14 being lost. I don't know how to figure that into a</p> <p>15 price, but that would be -- a lot of trees had to get</p> <p>16 cut down -- not a lot, a couple of them, so -- but</p> <p>17 there is value there but I'm not including that.</p> <p>18 Q. Was any electrical work redone as a</p> <p>19 result of the flood waters?</p> <p>20 A. Yes.</p> <p>21 Q. What?</p> <p>22 A. All the paneling for the basement or</p> <p>23 first floor, that was out. It is minor compared to</p> <p>24 what needs to be done just kind of within the back --</p> <p>25 in the back, the breaker box in the back.</p>	<p>1 Q. "Down here" being in the basement?</p> <p>2 A. Yeah.</p> <p>3 Q. Is that inside the basement or are some</p> <p>4 of these air conditioning units outside?</p> <p>5 A. Outside.</p> <p>6 Q. Yes.</p> <p>7 A. Well, that one was inside. Of course</p> <p>8 they are inside/outside, dual units.</p> <p>9 Q. Yeah.</p> <p>10 A. And the AC, that's, you know, for 15,</p> <p>11 16, 17, 18, 19 -- for 20 tons of AC, that's a</p> <p>12 relatively conservative figure.</p> <p>13 MR. DAIN: All right. Is lunch here?</p> <p>14 MR. HINSON: I was going to suggest. I</p> <p>15 didn't want to cut you off, but if you think you're</p> <p>16 at a place where you want might want to --</p> <p>17 MR. DAIN: I think this is a good</p> <p>18 time.</p> <p>19 MR. SALISBURY: -- collect your</p> <p>20 thoughts, we can take 15, however long you need.</p> <p>21 MR. DAIN: Yeah, let's do that.</p> <p>22 MR. SALISBURY: Okay.</p> <p>23 (Recess taken)</p> <p>24 Q. (BY MR. DAIN) So I would like to -- I</p> <p>25 am going to circle back to the question of the work</p>

39 (Pages 150 - 153)

Val Aldred

August 1, 2018

<p style="text-align: right;">Page 58</p> <p>1 A. No.</p> <p>2 Q. Okay. All right. We can set this aside</p> <p>3 for now.</p> <p>4 Okay. I'm going to ask you a few</p> <p>5 questions now about what happened during Harvey.</p> <p>6 And I've got a -- blank calendars somewhere in front</p> <p>7 of you. So feel free to refer to them if you have</p> <p>8 trouble recalling certain dates.</p> <p>9 A. Okay.</p> <p>10 Q. When did you first hear about the</p> <p>11 possibility that a storm like Harvey was coming?</p> <p>12 A. I think probably whenever the -- the TV,</p> <p>13 you know, stations started reporting it. I don't</p> <p>14 know exactly when that was, but sometime a couple of</p> <p>15 days before it hit.</p> <p>16 Q. Okay. At that time -- well, do you --</p> <p>17 can you give an estimate as to what date that was?</p> <p>18 A. You know, as I recall, this was a</p> <p>19 hurricane that kind of went away and came back from</p> <p>20 the dead again and just flared up pretty quickly.</p> <p>21 Probably the 21st or 22nd.</p> <p>22 Q. Okay. Would you have any text or e-mails</p> <p>23 or anything to show when you first knew about when</p> <p>24 the hurricane was coming?</p> <p>25 A. No.</p>	<p style="text-align: right;">Page 60</p> <p>1 neighborhood was -- was about under water and we</p> <p>2 would have been marooned.</p> <p>3 Q. When you say the entryway to your</p> <p>4 neighborhood, was -- was there -- is that a specific</p> <p>5 street?</p> <p>6 A. It's --</p> <p>7 Q. Are you looking at Exhibit 1?</p> <p>8 A. Yeah, I'm looking at Exhibit 1. It's the</p> <p>9 entrance at La Costa and Memorial.</p> <p>10 Q. Okay. How do you know that La Costa and</p> <p>11 Memorial were becoming impassable?</p> <p>12 A. We had gone down there to see it. I</p> <p>13 think my daughter had -- had driven down there and</p> <p>14 seen that it was filling up pretty quick.</p> <p>15 Q. Okay. Was -- when did water first enter</p> <p>16 your home?</p> <p>17 A. I wasn't on the property when that</p> <p>18 happened.</p> <p>19 Q. Okay. So it was after August 29th?</p> <p>20 A. It was after I evacuated.</p> <p>21 Q. Okay. And you evacuated on August 29th?</p> <p>22 A. Yes, sometime -- 4:00 o'clock in the</p> <p>23 afternoon, 5:00 o'clock.</p> <p>24 Q. And water entered your home after you</p> <p>25 evacuated?</p>
<p style="text-align: right;">Page 59</p> <p>1 Q. Okay. When you heard that Harvey was</p> <p>2 coming, did you prepare in any way?</p> <p>3 A. No.</p> <p>4 Q. Okay. Did you bring in sandbags at all?</p> <p>5 A. No.</p> <p>6 Q. Did you move any personal property</p> <p>7 upstairs?</p> <p>8 A. No.</p> <p>9 Q. Did you elevate any of your property or</p> <p>10 move it to higher ground?</p> <p>11 A. No.</p> <p>12 Q. Did you expect any flooding?</p> <p>13 A. No.</p> <p>14 Q. Why not?</p> <p>15 A. It was just a storm like a lot of other</p> <p>16 storms.</p> <p>17 Q. Okay. Did you plan to evacuate at all?</p> <p>18 A. No.</p> <p>19 Q. Did you evacuate at any point?</p> <p>20 A. We did on the 29th.</p> <p>21 Q. Why did you evacuate on the 29th?</p> <p>22 A. Well, the water was getting higher to the</p> <p>23 point where we -- if we were going to get out at</p> <p>24 all, we had to get out probably toward the latter</p> <p>25 part of that afternoon, because the entryway to our</p>	<p style="text-align: right;">Page 61</p> <p>1 A. That's right.</p> <p>2 Q. Do you have an estimate as to when the</p> <p>3 water entered your home?</p> <p>4 A. No.</p> <p>5 Q. Okay. Where'd you go when you were</p> <p>6 evacuated?</p> <p>7 A. To my daughter's house.</p> <p>8 Q. Where does she live?</p> <p>9 A. She lives in Fairfield, which is at 290</p> <p>10 and the Grand Parkway.</p> <p>11 Q. And did she get any flooding?</p> <p>12 A. No.</p> <p>13 Q. Okay. And how long did you stay there</p> <p>14 for?</p> <p>15 A. Well, we -- my wife stayed there until</p> <p>16 probably -- you know, through the better part of</p> <p>17 October or November. I came back to the house a</p> <p>18 couple of weeks later and lived upstairs to, you</p> <p>19 know, manage the repairs and recovery.</p> <p>20 Q. Okay. When you first -- when did you</p> <p>21 first return to your home after Harvey?</p> <p>22 A. So we came back the 31st, I guess. It</p> <p>23 would be a Thursday, the 31st.</p> <p>24 Q. Do you recall what time?</p> <p>25 A. Probably midmorning, maybe 10:00 o'clock.</p>

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Val Aldred

August 1, 2018

<p style="text-align: right;">Page 62</p> <p>1 Q. So you spent two nights away from your 2 home, then?</p> <p>3 A. That's -- well, before I came back on the 4 31st, yes.</p> <p>5 Q. Okay. And how long did you stay at your 6 home on the 31st?</p> <p>7 A. Well, we -- we went in, saw that the 8 water was still standing in the -- in the house, 9 took pictures, tried to put some furniture on -- in 10 cups and things like that so it wouldn't be standing 11 in water and -- not much we could do.</p> <p>12 Q. How much water did you see?</p> <p>13 A. At the time, probably about a foot. And 14 that's because it had receded, more than likely.</p> <p>15 Q. How much water do you estimate that you 16 received in total?</p> <p>17 A. About a foot and a half.</p> <p>18 Q. Okay. And what's that estimate based on?</p> <p>19 A. Based on the water lines that were on the 20 studs.</p> <p>21 Q. And was that water level uniform 22 throughout the house?</p> <p>23 A. I think so.</p> <p>24 Q. Did -- did you notice that one portion of 25 your home received more water than another portion?</p>	<p style="text-align: right;">Page 64</p> <p>1 furniture into paper cups. Did you take any other 2 steps at that time to try to save any of your 3 belongings?</p> <p>4 A. No. I mean, that was about all we could 5 do at the time. Everything -- everything we had 6 done before we evacuated was done, and it was all we 7 could do at the time.</p> <p>8 Q. Okay. Do you recall when you left your 9 home on the 31st?</p> <p>10 A. A couple hours later.</p> <p>11 Q. Okay. And during that time, had the 12 water level changed at all?</p> <p>13 A. I -- I don't know.</p> <p>14 Q. Okay. Do you recall when you next 15 returned to your home?</p> <p>16 A. It was a Saturday, the -- September 17 the 2nd.</p> <p>18 Q. Okay. And when you returned to your 19 home, what did you see?</p> <p>20 A. It -- it wasn't as much water. It -- to 21 that point, we could begin and did muck out all the 22 walls, tear down the walls, take out the sheetrock, 23 squeegee out whatever water we could that was near 24 the door.</p> <p>25 Q. So do you have an estimate as to how much</p>
<p style="text-align: right;">Page 63</p> <p>1 A. No, I don't recall.</p> <p>2 Q. Okay. You mentioned earlier, I believe, 3 that the home sloped downward the further north you 4 went. Did the north side of your home, which is, I 5 believe, the right side of your home, get more 6 water?</p> <p>7 A. You know, there was a lot of water that 8 day. I just don't remember. I mean, I didn't take 9 the time to measure it.</p> <p>10 Q. So when you came to your home on the 31st 11 around midmorning, can you just walk me through what 12 you saw?</p> <p>13 A. Yeah. I saw our street was still 14 flooded. We had to park on the street on 15 Thornbranch, which is the street east of ours. And 16 we parked as far as we could -- you know, as close 17 as we could and then walked around the -- the corner 18 and then crossed our street to the house.</p> <p>19 Oh, and then from there, we went inside 20 and saw all the water that was standing there and 21 just, you know, were, I guess, unhappy about it. We 22 were sad. It was -- took some pictures and, you 23 know, tried to -- tried to organize or get our -- 24 collect our thoughts as best we could.</p> <p>25 Q. Okay. You mentioned that you put some</p>	<p style="text-align: right;">Page 65</p> <p>1 standing water there was at that time on the 2nd?</p> <p>2 A. No, I don't.</p> <p>3 Q. Okay.</p> <p>4 A. I don't. I just -- no.</p> <p>5 Q. Okay. Were you able to squeegee out the 6 water?</p> <p>7 A. I know that I didn't. My wife may have 8 had a broom and tried to push some of it out.</p> <p>9 Q. Okay. Did your wife accompany you on 10 both trips?</p> <p>11 A. Yes.</p> <p>12 Q. Did anyone else accompany you?</p> <p>13 A. Let's see. My daughter who -- Casey came 14 with me on the first trip. I don't remember if she 15 was with me on the second trip. And then the 16 daughter I was living with accompanied me on the 17 second trip. I just -- there were people coming and 18 going, honestly.</p> <p>19 Q. Right.</p> <p>20 A. I don't remember who was who or when and 21 where.</p> <p>22 Q. Did you personally rip out the sheetrock 23 and the insulation?</p> <p>24 A. I did a little bit, yes.</p> <p>25 Q. And your family did as well?</p>

17 (Pages 62 - 65)

Val Aldred

August 1, 2018

<p style="text-align: right;">Page 66</p> <p>1 A. They did, plus people showed up from 2 church and the neighbors with tools and . . . 3 Q. Did you rip out all of the sheetrock on 4 the 2nd, or did it take a few days? 5 A. The second floor never touched any -- we 6 never touched the floor on the second. 7 Q. Sorry. I meant on September 2nd when you 8 returned to your home for the second time, is that 9 when you ripped out the sheetrock? 10 A. Yes, that's when we started doing it. 11 Q. Okay. And how long did that process 12 take? 13 A. Days. 14 Q. Okay. Do you have an estimate as to when 15 you might have completed that work? 16 A. Not as I sit here in front of you now, 17 no, I don't. 18 Q. Okay. 19 A. It's -- it was -- it was in stages. So 20 you get a bunch done and then wait a few days later 21 and some more would get done. I just -- 22 Q. Okay. 23 A. Probably by the middle of September, you 24 know, somewhere around there. 25 Q. Who determined how much sheetrock to rip</p>	<p style="text-align: right;">Page 68</p> <p>1 though, that got more than 4 feet of water, was 2 there? 3 A. There wasn't part of my property that got 4 any -- 4 feet of water anywhere. 5 Q. Right. Okay. Thank you. 6 And when did you move back to live on the 7 second floor of your home? 8 A. I couldn't tell you an exact date. I 9 would come and stay a few days, and then as 10 contractors were available and then when they left 11 and the next group would come in a few days after 12 that or whenever it was, I'd stay with my 13 daughter's -- at my daughter's house. 14 Q. Okay. Do you have any documentation that 15 would help refresh your recollection as to when you 16 spent your first night back at your home? 17 A. Do I have any? That's probably -- maybe. 18 You know, probably a picture, maybe an invoice of 19 when I bought a refrigerator or something. I . . . 20 Q. So to the best of your knowledge, do you 21 believe that the -- or when do you believe that the 22 water first receded from your home? 23 A. When it first receded. God only knows. 24 I don't know. It was there when we showed up, 25 so . . .</p>
<p style="text-align: right;">Page 67</p> <p>1 out? 2 A. Me and somebody who had -- who was -- who 3 was a builder that said you need to move it up 4 4-1/2 feet or whatever the -- whatever the 5 prescribed distance or measurement was. 6 Q. So did you take out 4 feet throughout 7 your -- throughout the whole first floor of your 8 home? 9 A. At least, yeah. 10 Q. Okay. Were there certain areas where you 11 took out more sheetrock? 12 A. Probably, yeah, because some people got 13 carried away. 14 Q. Is that the reason, that they got carried 15 away? 16 A. No, they just -- 17 Q. Okay. 18 A. -- probably didn't know what they were -- 19 how far they were supposed to go up the wall and 20 just -- 21 Q. Okay. 22 A. They weren't supervised. But it didn't 23 matter, you know, we were going to have to sheetrock 24 most everything anyway. 25 Q. But there wasn't a part of your property,</p>	<p style="text-align: right;">Page 69</p> <p>1 Q. Okay. 2 A. I mean, receding starts at the time it 3 reaches its highest point, so I don't know when that 4 would have been. 5 Q. Okay. When do you believe that the water 6 completely receded from your home? 7 A. Saturday probably -- I'd say Saturday we 8 were -- you know, the floors were wet, but it was -- 9 Q. Okay. So that would be Saturday, 10 September 2nd? 11 A. 2nd, yeah. 12 Q. Okay. So to summarize, you believe that 13 the flooding -- or your home took on water sometime 14 after August 29th and that that water receded 15 completely by September 2nd? 16 A. That's my -- that's my understanding. 17 Q. Okay. And you believe that your home 18 took on about a foot and a half of water? 19 A. Yes. 20 Q. Okay. And you believe that that water 21 level was pretty uniform throughout your entire 22 home? 23 A. Yes. 24 Q. Okay. How about your swimming pool? Was 25 that affected by Harvey?</p>

18 (Pages 66 - 69)

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
 2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
 3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
 4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO
 5 ALL DOWNSTREAM CASES)

6
 7 -----
 ORAL DEPOSITION OF

8
 PHILLIP AZAR

9
 JULY 9, 2018
 10 -----

11
 12 ORAL DEPOSITION OF PHILLIP AZAR, produced as a
 13 witness at the instance of the United States, and duly
 14 sworn, was taken in the above-styled and numbered cause
 15 on the 9th day of July, 2018, from 9:02 a.m. to
 16 5:03 p.m., before Morgan Veletzuy, CSR in and for the
 17 State of Texas, recorded by machine shorthand, at Kirby
 18 Mansion, 2000 Smith Street, Suite 550, Houston, Texas
 19 77002, pursuant to the Federal Rules of Civil Procedure
 20 and the provisions stated on the record or attached
 21 hereto; that the deposition shall be read and signed
 22 before any notary public.

1 today. If you don't understand me or you're having
2 trouble hearing, please ask me to clarify.

3 A. Sure.

4 Q. Your counsel may object, but answer unless
5 you're instructed not to. Try to answer with words, not
6 nods of the heads or "uh-huhs" or grunts. Let's try not
7 to talk over each other. I -- I tend to ask questions
8 slowly, so I'd ask that you don't try and anticipate
9 where I'm going and just let me finish the question.
10 And then I'm happy to let you answer as long as you'd
11 like.

12 I'll try to be as clear as possible again,
13 but let me know if you don't understand. If you need to
14 supplement a previous answer later in the deposition,
15 please feel free to do so. If at any point you want a
16 break, please let me know.

17 And then lastly, are you taking any
18 medication today that would prevent you from giving true
19 and complete answers?

20 A. I don't believe so. In fact, I forgot to take
21 my medications. I need to run back and take them. Can
22 I take a break real quick?

23 MR. ROBERTS: Yeah, sure.

24 MR. LEVINE: Sure. Sure.

25 Taking a break at 9:06.

(Break taken from 9:06 a.m. to 9:13 a.m.)

THE REPORTER: Back on the record at 9:13.

Q. (BY MR. LEVINE) Just ask that last question again: Are you taking any medication today that would prevent you from giving true answers?

A. No.

Q. How did you prepare for the deposition today?

A. I really didn't.

Q. Okay. Did you review any documents?

A. No, sir.

Q. Besides your attorneys, did you speak with anyone about the deposition?

A. Just my little girlfriend. I told her what I was doing.

Q. I'm sorry. Did you say your girlfriend?

A. Lisa.

Q. Does your girlfriend live with you?

A. Part-time.

Q. And where do you presently reside?

A. Right here, 2000 Smith.

Q. And did you live here at 2000 Smith Street during Hurricane Harvey?

A. I've been living both places during that time period; but when Harvey came along, I've been down here ever since. We all got displaced, me and my whole

1 family.

2 Q. And when you say the other place, which
3 property are you referring to?

4 A. I guess the subject property, 3 Magnolia Bend.

5 Q. And that's the only subject property that's
6 involved in this litigation that you're a plaintiff for?

7 A. Yes, I believe so.

8 Q. Okay. And when you said your whole family was
9 displaced during Harvey, who else lives with you at the
10 3 Magnolia property?

11 A. Jimmy Azar, my brother -- Jimmy Azar. Diloires
12 Azar, my sister. Dolly Azar, A-Z-A-R. That's it.

13 Q. Okay. So Jimmy's your brother, and Diloires is
14 your sister?

15 A. Yeah, Dolly and Diloires are sisters.

16 Q. Oh, two sisters?

17 A. Yeah.

18 Q. Okay.

19 A. And Jimmy's my brother.

20 Q. Okay. But they're not in-laws or anything like
21 that?

22 A. No, sir.

23 Q. Okay. And -- okay. I'll come back to that.

24 Was -- was your girlfriend Lisa with you
25 during Hurricane Harvey?

1 A. Correct. Yes.

2 Q. And were you at the 3 Magnolia Bend property
3 during Harvey?

4 A. No. I was here.

5 Q. Okay. Was anyone in your family at the
6 3 Magnolia Bend property during Harvey?

7 A. Yeah. Dolly -- the same ones I just gave you,
8 Dolly, Jimmy, and Diloires. They were all there.

9 Q. Were they there throughout the entirety of the
10 storm?

11 A. Until I called and I think Diloires called, too,
12 or one of them called, the sheriff's or 911 and they --
13 they got picked up by a boat.

14 Q. Do you know on what day they were picked up by
15 the boat?

16 A. I want to say the 28th or the 27th, 28th.

17 Q. Do you -- do you know what time of day they
18 were picked up?

19 A. Not really. I think it was light.

20 Q. It was daylight?

21 A. During the day. Yes, sir. So probably the
22 28th.

23 Q. Okay. So you think that your brother Jimmy and
24 sisters, Diloires and Dolly, were picked up by a boat
25 during the day on the 28th of August 2017?

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

THIS DOCUMENT RELATES TO:

DEPOSITION OF JANA CANAN BEYOGLU

9-18-18 HOUSTON, TEXAS



DEPOSITION OF JANA CANAN BEYOGLU

DEPOSITION AND ANSWERS of JANA CANAN BEYOGLU, taken before Edith A. Boggs, a certified shorthand reporter in Harris County for the State of Texas, taken at the law offices of Neel, Hooper & Banes, PC, 1800 West Loop South, Suite 1750, Houston, Texas, on the 18th day of September, 2018, between the hours of 1:49 p.m. and 5:06 p.m.

1 Turkish Airlines leaves about 8:30, 8:50. So, all the
2 way Friday afternoon, late afternoon, I was with them.

3 Q. So, on Friday, September 1st?

4 A. Friday, September 1st.

5 Q. So, at night, you flew to Turkey?

6 A. Uh-huh.

7 Q. Okay. And when did you return from Turkey?

8 A. Do you have next September calendar with you?

9 Q. Yes. I don't think I have marked this one yet.

10 (Exhibit 20 marked.)

11 Q. (BY MS. SANTACRUZ) So, I have marked the
12 September, 2017 calendar as Exhibit 20.

13 A. Either 10th or 11th, one of them. Either 10th
14 of September or 11th -- okay. Hold on. If I left
15 here -- did I stay for a week or two weeks? No. Water
16 stayed until here.

17 Okay. I think I -- I think we returned on
18 17th together, me and my husband. Yeah, I believe on
19 the 17th, 16th, yeah, somewhere around here because I
20 see that we were communicating her with our friends that
21 I stayed with, and she was taking pictures and sending
22 us. We knew that water was in the house -- I don't
23 know -- somewhere around all the way here. And then we
24 got a company to come to house to dry the house next
25 week. I believe we came back somewhere either 16th or

1 17th.

2 Q. The 16th or the 17th?

3 A. Either one of those days. I can find it if I
4 go into the -- my miles card when I returned. I can
5 kind exact date later if you need it. Yeah.

6 Q. And so, you talked about being in communication
7 with your friend while you were in Turkey?

8 A. Uh-huh.

9 Q. How did you communicate with her?

10 A. WhatsApp.

11 Q. WhatsApp?

12 A. (Witness indicated by nodding her head
13 affirmatively.)

14 Q. Okay. Do you still have those records?

15 A. I do.

16 Q. So, what were you communicating about while you
17 were in Turkey?

18 A. If the water is still in the house or not. And
19 actually, I believe she took several pictures around
20 this time that water was still in the house somewhere
21 around here, that high, and then it start going down
22 later after 5th or 6th.

23 Q. After the 5th or 6th?

24 A. Uh-huh.

25 Q. And is this the friend that lived --

1 A. Two blocks down, and then I stayed with them,
2 that's the friend.

3 Q. And her house didn't flood?

4 A. No. No.

5 Q. Okay. And you said that you hired a contractor
6 to clean up the house?

7 A. Yeah. We had a contractor to dry the house and
8 cut the Sheetrocks and all the stuff. I think they
9 worked on this week and take everything out from the
10 house that it messed up.

11 Q. Okay. So, to your recollection, everything
12 that was on the first floor -- and based on the pictures
13 that we just saw, Exhibit 8, everything that was on the
14 first floor was destroyed by the flood?

15 A. Yes, pretty much.

16 Q. Okay.

17 A. Not the flood. Not the flood. I think we
18 could have -- if the water was in and out, we could have
19 saved a lot of stuff but then the water rised after that
20 and stayed for ten days. I think we lost almost
21 everything. Yeah.

22 Q. So, you think that if --

23 A. Not the flood.

24 Q. It was not the flood?

25 A. Because we have friends that they flooded but



1 the water went out immediately a few hours later, and
2 mine stayed ten days. I mean, if it was only for a few
3 hours, I'm sure I could have saved a bunch of stuff that
4 I couldn't.

5 Q. So, how long did you estimate that the water
6 stayed in your home?

7 A. At least probably ten days. At least ten days.

8 Q. What makes you think that?

9 A. Because the pictures and the contractors and
10 then actually even the insurance agent that came and
11 looked and the water was still around, so, he said he
12 would come back. I think he came back somewhere 11th.
13 He couldn't come back this week. He came back on the
14 11th, insurance agent, I believe.

15 Q. Okay. Well, we have that next as an exhibit.

16 A. Yeah.

17 Q. So, Exhibit 9, we have his report.

18 A. Uh-huh.

19 Q. And he was there -- if you look at the next
20 page -- September 6th.

21 A. Yeah, he came and -- did he do some work on
22 September 6th? Because I remember he couldn't do some
23 of them on September 6th. He couldn't do everything and
24 he came back again.

25 Q. When did he come back?

1 A. I wasn't in the town that time. So -- he came
2 several times after that.

3 Q. Do you know who made the claim -- the phone
4 call to call the insurance?

5 A. I did.

6 Q. You did?

7 A. I did.

8 Q. From -- no. You were still here?

9 A. I was still here.

10 Q. Because it says right here that it was done on
11 August 29th, 2017.

12 A. I was here.

13 Q. So, you were the one that called in?

14 A. Yes.

15 Q. And if you look right next to it, it says,
16 "Date of loss." Do you see that?

17 A. Yeah.

18 Q. It says, "August 26, 2017 at 1:00 a.m." Do you
19 see that?

20 A. That's not right. That's the time -- that's
21 like -- that's the lady drowning. Mine was in the
22 morning, the 27th. That's not right.

23 Q. So, you believe this is incorrect?

24 A. Yeah. The 26th, 1:00 a.m. is not correct.

25 Q. Where do you think he got that information

1 from?

2 A. When he was -- he came in here, we weren't in
3 town. Me and my husband were out of country. So, our
4 friend and the contractors guy, they were with insurance
5 person. I don't know whatever they told him. Maybe
6 they got that. I cannot tell where he got that
7 information.

8 Q. Okay. And what is the name of the contractor?

9 A. Mesut, M E S U T.

10 Q. And the last name?

11 A. C U L H A C I. He's one of our friends also.

12 Q. And how much did you pay him to help you clean
13 up?

14 A. My husband would know it. Really, I don't
15 know.

16 Q. Are there any documents that would show how
17 much you guys paid?

18 A. I'm sure either check or card or something.
19 I'm sure.

20 Q. And what was it specifically that he did? So,
21 he just cleaned?

22 A. Actually, I have a video of what he did. When
23 we were in Turkey, he sent us a video of what they were
24 doing in the house.

25 Q. Have you provided that to your attorney?

1 A. We probably did. If it's not, I can provide
2 it.

3 Q. Okay.

4 A. I know I have that.

5 Q. Great. We'll follow up on that.

6 A. Yeah. Yeah.

7 Q. Okay. So, this date -- you said September 6th
8 is the first time it was inspected and at some point, he
9 came back?

10 A. He came back, yeah. I remember he came back.
11 He couldn't do some of the parts. That's how I
12 remember.

13 Q. And were you already in the States when he --

14 A. No. I was out. We were out of country.

15 Q. When he came back the second time?

16 A. After that, really my -- emotionally, I wasn't
17 ready to go back to house. So, I wasn't with him.
18 Maybe my husband was but I don't know. I was totally --
19 I couldn't go see the house after that.

20 Q. When was the first time that you saw it after
21 you left -- you came back from Turkey?

22 A. The night that we flew in, we just drove by in
23 the car. And after that, I probably didn't go back
24 maybe two or three weeks, four weeks. I don't know. I
25 couldn't go back. I still cannot go back.

1 Q. Okay. And after you came back, where did you
2 stay?

3 A. We rented an apartment immediately. We moved
4 into an apartment because we didn't know how the house
5 looked or anything when we were in country. I mean, you
6 don't think that it will be this bad only if it was just
7 a little water. So, we just didn't want to purchase a
8 house or anything. We didn't want to go to anybody
9 else. So, we rented an apartment.

10 Q. So, by the time you flew from Turkey --

11 A. Into our apartment.

12 Q. -- you had already leased an apartment?

13 A. Yes.

14 Q. Do you mind just marking down the dates when
15 you believe you returned to the States?

16 A. Either this or this, 16th or 17th, somewhere
17 around then, we came back to Houston.

18 Q. And were you able to salvage your belongings on
19 the second floor?

20 A. We had -- I had kids' room and then the guest
21 room. The guest room didn't have anything anyway, just
22 the bed. And the kids' room, we took their -- because
23 it was staged, our house before, they were -- anything
24 in the closets, whatever, they were boxed and they were
25 in the garage. We had only beds, just furnitures.

1 Those were saved. Actually, those were the ones went to
2 apartment for us.

3 Q. And how long were you at that apartment?

4 A. Until January. So, October, November,
5 December, January. Probably four months.

6 Q. You signed a lease agreement for that
7 apartment, right?

8 A. Actually, we signed a lease agreement for a
9 year.

10 Q. For a year?

11 A. And I couldn't stay in the apartment because it
12 was choking me. I couldn't stay. So, we had to break
13 the lease and pay extra, whatever the penalty was.

14 So, I thought I could live on the second
15 floor maybe in our house so we can maybe fix the house
16 during that time but there were no contractors right
17 away. We couldn't find anybody to do any work.

18 And we just kind of -- we didn't know what
19 to do. So, we moved back to the upstairs but no kitchen
20 or anything. So, at that time, we purchased a house.
21 We couldn't stay. And we moved end of February to our
22 new house.

23 Q. When did you move back to the house to live on
24 the second floor?

25 A. The end of January, I'm thinking, maybe.

1 Q. The end of January?

2 A. Yeah. We tried that if we stayed upstairs, we
3 maybe can fix the house on the bottom floor when we were
4 in the house, but I think mold was too much and the
5 smell and all the stuff in the house, and I couldn't
6 stay there.

7 Q. Do you have any of the records about when you
8 leased the property and when you broke the lease?

9 A. We can get it from the apartment.

10 Q. Okay.

11 A. I'm sure they have the papers still.

12 Q. Yeah. Because if I remember correctly, your
13 husband's testimony was that you guys lived there for
14 about eight to nine months in the apartment. That seems
15 too long?

16 A. Eight to nine months? We got our new -- we got
17 our new house end of February. So, we moved in.
18 There's no way.

19 Q. Okay.

20 A. We can ask the apartments to provide the
21 documents.

22 Q. Yeah.

23 A. We can do that. I'm sure they have it.

24 Q. Okay. So, after about --

25 A. There is no way I could have lived in that

Dana Cutts

June 27, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO)
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 DANA CUTTS

9
 JUNE 27, 2018
10 -----

11
12 ORAL DEPOSITION OF DANA CUTTS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 27th day of June, 2018, from 9:07 a.m. to
16 2:55 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at the
18 offices of McGehee, Chang, Landgraf, 10370 Richmond
19 Avenue, Suite 1300, Houston, Texas 77042, pursuant to
20 the Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.

1 A. I have no knowledge of that.

2 Q. Do you have any photographs of what occurred on
3 your property during the time when you were away?

4 A. No.

5 Q. Okay. And what date did you return to your
6 home?

7 A. Well, whatever eight days later. It says in
8 the -- do you have it?

9 Q. I think right underneath the map right in front
10 of you, I think that that's Exhibit 14.

11 A. Thursday, September 7th.

12 Q. Okay. Okay. Describe the process of coming
13 back to your home.

14 A. Parking a half a mile away. Sloshing through
15 all of our neighbors' yards up close to their houses
16 because there was standing water in the yards as well.
17 You could not walk on the sidewalk or the street. Their
18 lawns got pretty wrecked by all of the people. There
19 were emergency vehicles everywhere. People were still
20 being rescued from the back.

21 When we walked into our house, there was
22 still standing water in the floors that we mopped up.
23 That's -- that's it pretty much, yeah.

24 Q. Okay.

25 A. On that one day, that particular day.

1 today, the various steps to get back into your house.

2 A. That's a very broad -- I'll try to give you
3 some basic. The beginning started on the 8th when we
4 got back in. Volunteers came and threw out carpet. The
5 9th, they pulled out some Sheetrock.

6 The next week, we hired someone at great
7 expense to pull out the rest of the Sheetrock, pull out
8 all of the -- and clean up, spray and sanitize, mold
9 removal -- not mold removal, but to spray for
10 everything, bleach it. Clean and sanitize our garage.

11 We moved what we thought we could save into
12 the garage for storage. The garage was closed. It was
13 un-air-conditioned. About mid-October, I guess, our
14 contractor started. He explained to us things were
15 difficult to get. Everyone was clamoring for stuff, and
16 it would be a while. He started in, I think,
17 mid-October. I may be wrong about that.

18 It took us that long to dry out the house.
19 We had to buy dehumidifiers, four of them. We had to
20 buy a whole bunch of fans. We had to buy more Clorox.
21 We had to buy more mold inhibitor, et cetera -- whatever
22 that's called -- and spray it.

23 When he started, it took him -- we moved
24 back in May 31st. It was a very slow process with a lot
25 of starts and stops in it. The City could not make up

Inga Godejord

September 17, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE DOWNSTREAM : Sub-Master Docket

3 ADDICKS AND BARKER : No. 17-cv-9002L

(TEXAS) FLOOD-CONTROL :

4 RESERVOIRS : Judge Susan G.

: Braden

5 :

THIS DOCUMENT RELATES :

6 TO: :

ALL TEST PROPERTIES :

7 * * *

8 MONDAY, SEPTEMBER 17, 2018

9 * * *

10
11
12 Oral deposition of INGA GODEJORD taken
13 at the law offices of Neel, Hooper & Banes,
14 P.C. 1800 West Loop South, Suite 1750,
15 Houston, Texas, commencing at 1:01 p.m.
16 before Debbie Leonard, Registered Diplomate
17 Reporter, Certified Realtime Reporter.
18
19
20
21
22

23 * * *

1 furniture?

2 A. No.

3 Q. Do you -- did your son
4 communicate with you and tell you when he was
5 leaving the house?

6 A. Yes, he did.

7 Q. And what did he say?

8 A. He said that he's going to
9 leave the house, and it was August 28 when he
10 said that.

11 Q. And could you -- did he explain
12 to you why he was leaving?

13 A. Not really. He just made a
14 decision, and he left.

15 Q. Did he tell you if he saw any
16 water in the house at the time that he left?

17 A. No. He said that we are 3 feet
18 clear. That was his last observation before
19 he left.

20 Q. I'm going to show you some
21 photographs. If you could look at Exhibit
22 Number 2.

23 (Previously marked
24 Exhibit Godejord-2 was referred to the
25 witness.)

1 sorry.

2 BY MS. HELD:

3 Q. And this is still while you're
4 in Canada, these photos were taken?

5 A. Yes, ma'am.

6 Q. Now, besides the Stackhouses,
7 were you communicating with anyone else in
8 your neighborhood about flooding while you
9 were in Canada?

10 A. No. Only with Stackhouses.

11 Q. And were you communicating with
12 anyone else in Houston that was going to your
13 neighborhood to observe the flooding for you
14 while you were in Canada?

15 A. Only my son.

16 Q. So do you know how high the
17 water reached in your house?

18 A. According to my husband,
19 2 feet.

20 Q. But did you make any
21 observations yourself?

22 A. I saw the water line. It was
23 approximately 2 feet high.

24 Q. And do you have any photographs
25 of the water line?

1 500-years floodplain.

2 Q. So after you returned to
3 Houston from Canada, when -- when did you
4 begin the cleanup of your house?

5 A. The day I entered the house.

6 Q. And that was September 11th or
7 12th?

8 A. 11th or 12th.

9 Q. And what type of tasks did you,
10 yourself, do in the cleaning up of your
11 property?

12 A. My task was to salvage the
13 things that was still in a good order or was
14 not damaged.

15 Q. Were there any -- was any of
16 your property on the second floor of the
17 house damaged? And when I mean "property," I
18 mean personal property, like clothing or
19 furniture, things like that?

20 A. No, no things on the second
21 floor.

22 Q. I would now like you to look at
23 Exhibit 4.

24 (Previously marked

25 Exhibit Godejord-4 was referred to the

1 A. Using --

2 Q. How did you do that?

3 A. Dehumidifiers and fans. For a
4 couple of months. We called in different
5 inspections. They checked humidity in the
6 house, termites. Different, I will say,
7 sicknesses and things. They checked those.

8 Q. Did they look for mold?

9 A. Mold, yes.

10 Q. And did these inspectors create
11 any reports of their findings?

12 A. They did.

13 Q. Do you recall if you provided
14 those reports to your attorneys?

15 A. I do not recall.

16 Q. Do you recall what the findings
17 were of the reports on mold -- well, the
18 report on mold?

19 A. It was negative.

20 Q. And when you say that you dried
21 out the house with fans and dehumidifiers,
22 did you hire a company to do that?

23 A. No, I did it myself.

24 Q. Did you have to purchase the
25 fans.

1 A. Yes.

2 Q. And how long did that take for
3 the fans and dehumidifier to dry --

4 A. A couple of months.

5 Q. So are you currently living in
6 the house?

7 A. No, we do not live in the
8 house.

9 Q. Where have you been living
10 since you returned from Canada after
11 Hurricane Harvey?

12 A. First we lived in few hotels,
13 and then we rented apartment.

14 Q. Now, we had talked about how
15 your son was at your house right before the
16 flooding, correct?

17 A. Yeah.

18 Q. So is he -- is he living with
19 you in the rental house now?

20 A. Yes, he does.

21 Q. So if you look at Exhibit
22 Number 17, this is a -- it contains multiple
23 change orders, and they're dated from
24 April 2018 up until July 2018.

25 And do you know, have you

1 received any other change order forms from
2 Stiffel Homes after the July 2018 one was
3 given to you?

4 A. I want to say yes, we did, just
5 recently.

6 Q. And do you know if you've
7 provided that to your attorney yet?

8 A. No, we did not. We got them
9 just few days ago, I guess.

10 Q. And do you know generally what
11 type of work still needs to be completed in
12 the house before you can move back in?

13 A. We don't have all appliances,
14 and couple of inspections should be done,
15 cleaning of the house.

16 Q. Do you plan to move back into
17 the house?

18 A. Yes, we do.

19 Q. So going back to the
20 Continuation Sheet exhibit, which I believe
21 was Exhibit 6, or was it 5?

22 A. Exhibit 5.

23 Q. Exhibit 5.

24 So as far as the highlighted
25 tasks are concerned, do you know if any of

Mr. Jeremy E. Good

July 19, 2018

Page 1

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE UPSTREAM ADDICKS §

AND BARKER (TEXAS) §

FLOOD-CONTROL RESERVOIRS § SUB-MASTER DOCKET

§ NO. 17-cv-9002L

§

§ Chief Judge Susan G. Braden

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

§

ORAL DEPOSITION

MR. JEREMY E. GOOD

July 19, 2018

ORAL DEPOSITION OF MR. JEREMY E. GOOD, produced
as a witness at the instance of the United States and
duly sworn, was taken in the above-styled and
numbered cause on the 19th day of July, 2018, from

a.m. to 12:23 p.m., before Michelle Hartman, 9:00

Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Raizner Slania, LLP, 2402 Dunlavy Street, Houston,
Texas 77006, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or

attached hereto.

1 Q. Okay. Let me jump ahead just a little
2 bit. When was the first time that you were able to
3 get to the property?

4 A. September the 10th.

5 Q. And why were you -- why did it take so
6 long for you to get to the property?

7 A. That's when it was first accessible.
8 The flood waters had finally dissipated at that point
9 and we were finally able to access it. And I
10 actually had to park my car a mile away and walk in.
11 They weren't allowing cars at that point.

12 And if you see, too, I believe on one
13 of these things, (indicates) it indicates that I was
14 trying to get up there. Let me see here.

15 For example, on page -- this is my
16 page nine. On Thursday, August 31st, I had told
17 them, "I'm attempting to go again this afternoon.
18 Another contractor I use tried to get in but the
19 roads seem bad. Keep you posted."

20 So I was trying almost on a daily
21 basis to get up there. Again, I would look at the
22 maps and say, well, I know this is closed, they are
23 probably just letting locals through. Again, I had
24 no idea the extent of what was truly happening.

25 Q. And let me just confirm: This text

1 string -- and this document contains a text string.
2 It is a single text string between the three people
3 that you have identified?

4 A. Correct.

5 Q. Okay. When you go there on
6 September 10th, could you describe for me what you
7 saw as far as water level.

8 A. I arrived on the property on the
9 evening of Sunday, September 10th, I would say
10 approximately 8:00 o'clock. It was after a function
11 I had just played for. I had to very carefully walk
12 through the mud at that point. It was -- it was hard
13 to find solid surfaces.

14 The water at that point had dissipated
15 to puddles. So I believe I was able to at least get
16 to the outside of the building that evening, but
17 there were still again standing water in some places
18 and complete mud and impassable sections in others.

19 Q. But there was no longer a constant
20 inundation between the stream and the units?

21 A. That's correct.

22 Q. What is your understanding as to when
23 flood waters were no longer present in the unit
24 itself? And I don't mean by the time the building
25 dried out, I mean Monday --

1 A. Sure.

2 Q. -- when the water was no longer -- was
3 no longer -- the flood level was no longer at that
4 level?

5 A. I can't speculate when the water was
6 out. The only thing I know is when the -- the
7 authorities there, I believe it was the police, said
8 that we were able to go in and access that area.

9 Q. And do you have any understanding as
10 you sit here today as to when the flood waters
11 receded from the common property of Memorial Mews?

12 A. Again, I would -- I would say I can't
13 speculate the exact dates. I just know when the
14 roads were passible.

15 Q. And I will just ask the last one too:
16 You don't know -- as you sit here today, know when
17 the banks of the creek were no longer overflowing?

18 A. I do not.

19 Q. Were the tenants required to leave the
20 property?

21 A. I'm not sure if the evacuation
22 happened. A mandatory evacuation was in place in
23 that area. So I can't speak definitively on that,
24 but my understanding with the waters rising and the
25 boats that were coming for rescues, I would surmise

1 that they were.

2 Q. Do you know whether they, in fact, left
3 the properties?

4 A. They all left the property.

5 Q. Okay. Do you know when they left the
6 property?

7 A. I do not know the exact dates other
8 than I can look at the text message here. It looks
9 like -- it doesn't indicate on this particular text
10 stream that I'm looking at. I do have one that I
11 recall with Elizabeth, who was in Unit D, that she
12 left on Tuesday, August the 29th, and I believe she
13 also was evacuated on a raft.

14 Q. Okay. So Unit D you believe left on
15 the 29th?

16 A. Correct.

17 Q. Unit C may be reflected in Exhibit 6,
18 if it's -- if you do know what date, it would be
19 because it's in this document?

20 A. It does not appear to be in this
21 document. It might be in an e-mail with -- with
22 them, but I do not see any indication on when they
23 left here. I know that they were in the unit on
24 Monday, August 28th.

25 Q. Okay. Well, then let me just ask:

1 What is your understanding, if you have one, of when
2 the tenants in Unit C left?

3 A. I don't have that in my memory. I
4 would -- I would have to go back and check, but my
5 guess is they left sometime -- you know what, I would
6 say let's check the text messages on that. I don't
7 have that, if it was Monday or Tuesday.

8 Q. Okay. And just help me recall: Was it
9 Unit A that weren't there or Unit B that wasn't there
10 to begin with?

11 A. Unit B was not there to begin with,
12 so --

13 Q. And how about the tenants in Unit A,
14 how long did they stay at the property?

15 A. I would have to check Unit A's
16 correspondence. I do have -- I do see on page four
17 of that stream with Unit C on Monday, August 28th at
18 11:19, I acquired, "Any update on your situation?"

19 Where one of them responded, "We left.
20 The water was coming in. I had to take my family out
21 ASAP. All the street was flooded. Please bear with
22 us."

23 Q. Okay.

24 MR. MCGEHEE: When was that, Jeremy?

25 THE WITNESS: That was Monday,

1 August 28th at 11:19 a.m. I believe -- I believe it
2 was 11:19. Let me -- the -- my hesitation on this
3 now is it's -- that I am looking over it, it does not
4 have timestamps other than when I started the text.

5 It looks like I started the text there
6 at 8:24, which goes through until a new text was
7 started at 11:19. That's when I asked if there was
8 any update on the situation. At that point that
9 response, "We left, the water was coming in," could
10 have happened any time between 11:19 and then when
11 the text message, the time stamps the next day for
12 Tuesday, August 29th. So I'm not sure of -- there.

13 Q. (BY MR. DAIN) Would you just reference
14 the page you're looking at.

15 A. You bet, yes. I'm going back and forth
16 between page three and page four.

17 Q. At the bottom of page three it says,
18 "Any update on your situation?"

19 A. Which is then repeated again at the top
20 of page four.

21 Q. Which is then repeated at the top of
22 page four.

23 A. My only -- my uncertainty is when they
24 exactly responded back, if it was at 11:20 or if it
25 was later on in that day, the next message. Then

1 have some power expenses that I had to pay since that
2 was going on.

3 So we kept everything separate as far
4 as what would have been an expense due to the flood
5 and then just normal operating expenses.

6 Q. I see what you're saying.

7 So, in fact -- so, in fact, I got it
8 backwards. This document -- this total reflects
9 expenses and costs that were not related to the
10 flood?

11 A. Correct.

12 Q. And so nowhere in Exhibit -- nowhere in
13 Exhibit 14 are there numbers that reflect expense and
14 repairs incurred responding to the flood?

15 A. The only things I would highlight would
16 be the -- I refunded the security deposits to the
17 tenants A and C just in good faith of realizing what
18 they had gone through. And then also in the next
19 section, the rental income section is also reflected
20 where I did not receive any rents from September
21 through December on three of the four units.

22 Q. Are the rental rates -- well, would you
23 compare for me the rental rates of the units in July
24 of 2018 compared to July of 2017?

25 A. July of 2017, the rents were as

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 WAYNE HOLLIS
10 JULY 19, 2018
11 -----

12 ORAL DEPOSITION OF WAYNE HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 8:59 a.m. to
16 12:13 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.

<p style="text-align: right;">Page 46</p> <p>1 A. Thank you.</p> <p>2 Q. And get your -- get your mother-in-law out as</p> <p>3 well and your wife.</p> <p>4 So were you able -- did you get on the</p> <p>5 catamaran as well, or were you able to --</p> <p>6 A. No, I waited.</p> <p>7 Q. And about how -- how high up was the water in</p> <p>8 the street at that time?</p> <p>9 A. In the -- in the street, it was probably 2 to</p> <p>10 3 feet. And we went across the yards. We didn't go in</p> <p>11 the street. The water was so swift flowing down River</p> <p>12 Forest that we didn't attempt to get out on the street.</p> <p>13 We stayed up on the -- went around through the yards.</p> <p>14 Q. So cutting through your backyard or --</p> <p>15 A. No. We didn't cut through the backyard. We</p> <p>16 cut through -- across these two yards here to Bayou</p> <p>17 Knoll. And our son drove down Bayou Knoll and picked us</p> <p>18 up.</p> <p>19 Q. So why don't I have you take the red pen and</p> <p>20 just -- you can -- you can draw the path that you took</p> <p>21 through your neighbors' yard and an X where your son was</p> <p>22 able to drive into.</p> <p>23 A. We stayed on the yards here, and went up here.</p> <p>24 And he got about right there.</p> <p>25 Q. Okay. Very good. And you said that at the</p>	<p style="text-align: right;">Page 48</p> <p>1 terribly familiar with Houston. It's such a large area.</p> <p>2 A. About 6 miles away from us.</p> <p>3 Q. About 6 miles? Okay.</p> <p>4 And were you able to stay with him for the</p> <p>5 duration of the storm?</p> <p>6 A. We're still staying with him.</p> <p>7 Q. You're still staying with him. Okay. Very</p> <p>8 good.</p> <p>9 And did your son experience any flooding?</p> <p>10 A. None.</p> <p>11 Q. And when was the first time you were able to</p> <p>12 return to your property?</p> <p>13 A. We returned the 29th by boat to rescue some</p> <p>14 valuables and move some stuff upstairs out of the water,</p> <p>15 trying to salvage some stuff.</p> <p>16 Q. And you said "we." Who returned with you on</p> <p>17 the 29th?</p> <p>18 A. My son and a couple of guys here in town that</p> <p>19 were rescuing everybody. I can't recall his name right</p> <p>20 now --</p> <p>21 Q. That's okay.</p> <p>22 A. -- but he got an award for rescuing.</p> <p>23 And then we went back again on the 30th by</p> <p>24 boat to try to salvage more. And at that time water was</p> <p>25 about waist deep or a little higher in the house and was</p>
<p style="text-align: right;">Page 47</p> <p>1 time you evacuated around 1:30, there was water running</p> <p>2 down River Forest Drive. Were you able to discern what</p> <p>3 direction that water was coming from and going to?</p> <p>4 A. Sure. It's coming from the northwest to the</p> <p>5 southeast.</p> <p>6 Q. Okay. Can you draw just an arrow?</p> <p>7 A. (Witness complies.)</p> <p>8 Q. So coming from the northeast, past your</p> <p>9 property, and then flowing toward the bayou?</p> <p>10 A. Yeah, going down River Forest and kept</p> <p>11 continuing to flow like this.</p> <p>12 MR. HARTMAN: Sorry. I just wanted to</p> <p>13 clarify that you were pointing northwest. It was coming</p> <p>14 from the northwest.</p> <p>15 MS. TARDIFF: From the northwest. Thank</p> <p>16 you.</p> <p>17 A. From the northwest to the southeast.</p> <p>18 Q. (BY MS. TARDIFF) Okay. Thank you for that</p> <p>19 clarification. We want that clear.</p> <p>20 And so once you left with your son, did you</p> <p>21 go to his home?</p> <p>22 A. Yes.</p> <p>23 Q. And where does he live?</p> <p>24 A. He lives at 10935 Britt Way.</p> <p>25 Q. And you'll have to forgive me because I'm not</p>	<p style="text-align: right;">Page 49</p> <p>1 continuing to rise.</p> <p>2 Q. So when you returned on the 29th by boat, do</p> <p>3 you recall what time you arrived at your home?</p> <p>4 A. Probably around noon-ish.</p> <p>5 Q. Okay. And starting with -- with the</p> <p>6 neighborhood and the street, can you describe the water</p> <p>7 levels, your observations at that time?</p> <p>8 A. Yes. It was about -- well, you could run a</p> <p>9 boat with a big engine in it. It was 3 to 4 feet in the</p> <p>10 streets on River Forest.</p> <p>11 Q. And on the -- on the 29th, was there still a</p> <p>12 discernable kind of direction of the flow of the water</p> <p>13 through the streets?</p> <p>14 A. Still the same, from the northwest to the</p> <p>15 southeast.</p> <p>16 Q. And were you able to get into your home on the</p> <p>17 29th?</p> <p>18 A. Yes.</p> <p>19 Q. And I think you described for me the water was</p> <p>20 about waist deep at that point.</p> <p>21 A. It was about a little -- a little below waist</p> <p>22 deep on the 29th. And by the 30th, it was above my</p> <p>23 waist.</p> <p>24 Q. Okay. And were you able to move a few things</p> <p>25 upstairs at that point?</p>

<p style="text-align: right;">Page 50</p> <p>1 A. Only clothes and stuff we got out of the water 2 in the lower hangers downstairs. The furniture was all 3 already under water. Everything was ruined downstairs. 4 Q. And about how long did you stay at the house on 5 the 29th? 6 A. Probably an hour, hour and a half. 7 Q. And did you have neighbors who were still 8 trying to stay in their homes? 9 A. Trying to salvage medicines and things like 10 that. 11 No. Everybody had evacuated by then. 12 Q. And were you able to salvage some medicines to 13 bring -- 14 A. Some -- 15 Q. -- back? 16 A. Some medicines, some clothes. 17 THE REPORTER: Will you just try to wait 18 until she finishes, please? 19 THE WITNESS: Okay. 20 Q. (BY MS. TARDIFF) And so on -- on the 30th, 21 which is Wednesday, I believe. Yes. So the 29th was 22 Tuesday. The 30th was Wednesday. About what time did 23 you return by boat on the 30th? 24 A. Around noon again, also. 25 Q. And again, what were your observations about</p>	<p style="text-align: right;">Page 52</p> <p>1 water had receded and they had closed the gates on the 2 dam. 3 Q. And when you returned on the -- on the 8th or 4 the 9th, who -- who returned with you on that day? 5 A. Peggy, my son, and about 20 volunteers. 6 Q. And I'm going to ask you to kind of describe 7 your observations. Do you need a break at any time? 8 A. Pardon me? 9 Q. Do you need a break before we kind of go 10 through that? 11 A. No. 12 Q. Okay. If you do at any time, just let me know. 13 Okay. So about -- and do you know whether 14 it's the 8th or 9th or just sometime -- 15 A. I would say the 9th. 16 Q. Okay. All right. I think I saw a note to that 17 effect, so that sounds right. 18 So when you returned on the 9th, do you 19 recall what time you returned? 20 A. Mid-morning. 21 Q. Okay. Was there -- was there any water still 22 in the streets? 23 A. No. 24 Q. Okay. How about any -- any water remaining in 25 your yard?</p>
<p style="text-align: right;">Page 51</p> <p>1 the water levels in the street at that time? 2 A. It had risen another 10 to 12 inches. 3 Q. And your estimate of it having risen another 10 4 to 12 inches, were you looking at mailboxes? windows? 5 What were you looking at to kind of gauge the level? 6 A. Mailboxes, street signs. 7 Q. Okay. And again, can you describe for me, 8 you're able to get into your house again on the 30th? 9 A. Yes. 10 Q. And you had said the water was kind of above 11 your waist at that point. 12 A. Yes. 13 Q. So about how much higher was it in the house? 14 A. It reached a total of about 42 to 44 inches. 15 Q. Was it -- was it that high on the 30th? 16 A. Yes. I have a video of it. Y'all have a 17 record of it, and you can see. 18 Q. Yeah. Yeah. 19 And that's the highest that the water 20 reached in your house, as far as you know? 21 A. No. It would -- I feel it went higher, but we 22 never went back until... 23 Q. So after the 30th, when -- when was the next 24 time you were able to return? 25 A. September the 8th or 9th -- the 9th, when the</p>	<p style="text-align: right;">Page 53</p> <p>1 A. No. 2 Q. Okay. Was there any -- I understand your home 3 was certainly still wet inside, but was there any 4 standing water in your home or had it drained away? 5 A. Yes. There was sludge and water retained in 6 the home. 7 Q. And based on your observations in the home at 8 that time, you know, what's your estimate of -- as to 9 how high the water got in your home while you were away? 10 A. About 43 to 45 inches. 11 Q. And so the -- the water itself stayed on the 12 first floor. You didn't get any water on the second 13 floor aside from water that was brought up when you 14 moved? 15 A. Correct. 16 Q. Okay. Any -- any other rainwater getting into 17 the upper levels of your home through windows or the 18 roof or anything? 19 A. No. 20 Q. And did you actually start kind of salvage 21 operations in your home on the 9th in terms of removing 22 things? 23 A. Yes. 24 Q. And about how long -- how many -- was that a 25 period of days or weeks?</p>

<p style="text-align: right;">Page 54</p> <p>1 A. We probably worked on it six to eight days 2 throwing stuff out. 3 Q. And was the County removing damaged goods at 4 that time, or did you have to hire somebody to remove? 5 A. I had some friends that came with trucks and 6 grapples and removed our stuff for us prior to waiting 7 on the County. 8 Q. And I'll ask your wife more details about the 9 flood insurance; but before you came back on the 9th, do 10 you know, had you contacted your insurance company? 11 A. Yes. 12 Q. Okay. And did you get assistance promptly in 13 terms of getting help with the salvage operations? 14 A. Yes. They had an adjuster out while we were 15 salvaging. 16 Q. And looking at Exhibit 1, and I'll ask the 17 question generally, but did all of the homes in the 18 Nottingham Forest 8 neighborhood have floodwater, to 19 your knowledge? 20 A. No. 21 Q. No. Okay. Maybe we look at the second page 22 which has -- so to your knowledge, what areas of 23 Nottingham Forest Section 8 -- 24 A. I'm going to say the west section about three, 25 four streets in, and then the southern section, from</p>	<p style="text-align: right;">Page 56</p> <p>1 THE WITNESS: Did have flooding. Where did 2 you see Carolcrest in here? 3 MR. HARTMAN: I think that Carolcrest is 4 right there. 5 THE WITNESS: Okay. Let's get it 6 orientated the way it should be. That will help. 7 A. Well, Bramblewood flooded all the way to the -- 8 Dairy Ashford, though. So roughly that area, which 9 would be the -- the western part of the subdivision -- 10 Q. (BY MS. TARDIFF) Okay. 11 A. -- down. And the bayou comes here and 12 Bramblewood went underwater up to the eaves of their 13 homes, so... 14 Q. And Bramblewood, those are the homes that are 15 adjacent -- 16 A. Yeah, all adjacent to the green space. 17 Q. Okay. And up to the eaves for those. 18 So as you moved away from Buffalo Bayou, 19 were the water levels lower? 20 A. Yeah. 21 Q. All right. Thank you. 22 And actually, just so we're clear on the 23 record, I'm just going to have you mark the -- the area 24 below your red line that flooded just with an F. 25 A. (Witness complies.)</p>
<p style="text-align: right;">Page 55</p> <p>1 Carolcrest, which is a street north of us, flooded on 2 this end. They didn't flood on this end. And then 3 Bramblewood, the corridor along the bayou flooded. And 4 all of these houses here remained dry. 5 Q. So I'm going to have you take the red marker, 6 and we're on the second page of Exhibit 1 -- 7 A. It's not going to be correct. 8 Q. I know this is -- this is an approximate, but 9 just, you know, your -- your understanding or 10 recollection of the area. 11 A. I can't read that. I'm not clear on where 12 Carolcrest is. 13 MR. HARTMAN: Carolcrest is right there 14 (indicating). 15 THE WITNESS: Yeah, that's Carolcrest. 16 Then where is Bayou Knoll? 17 MR. HARTMAN: Bayou Knoll's right there. 18 THE WITNESS: I can't see this. It's too 19 small. 20 MS. TARDIFF: It is small. I apologize. 21 MR. HARTMAN: Sorry, Kris. Do you want him 22 to circle the areas that had flooding or the areas that 23 didn't? 24 MS. TARDIFF: The areas that did have 25 flooding.</p>	<p style="text-align: right;">Page 57</p> <p>1 Q. There we go. The hatch marks, that works well, 2 too. Perfect. So that's marked as hatch marks. Thank 3 you very much. 4 And I know you produced a lot of documents 5 about the losses from the flooding certainly on your 6 first floor. Was -- just generally speaking, was there 7 anything salvageable from your first floor? 8 A. Nothing other than some clothes that we 9 immediately took to the laundry, wet clothes. And they 10 salvaged some and threw away a ton of them. 11 (Exhibit 5 marked.) 12 Q. (BY MS. TARDIFF) All right. I want to have 13 you take a look at a few e-mails just kind of piecing 14 together our timeline here. So what I've marked as 15 Hollis Deposition Exhibit 5 is Bates-stamped Hollis 16 00773. 17 And, Mr. Hollis, do you recognize this 18 printout of an e-mail from you to -- is it Lilla Wright? 19 A. Lilla Wright. 20 Q. Lilla Wright, on Sunday, August 27th, 2017, at 21 7:54 p.m.? 22 A. Yes. 23 Q. So was this after you had returned home from 24 your travels on Sunday? 25 A. Yes.</p>

<p style="text-align: right;">Page 62</p> <p>1 A. At that point.</p> <p>2 Q. At that point. Okay.</p> <p>3 Was -- was the water rising even while you</p> <p>4 were there on the 29th?</p> <p>5 A. Yes.</p> <p>6 Q. Okay. So about how much higher was it when --</p> <p>7 when you left on the 29th?</p> <p>8 A. It was probably another 10 to 12 inches.</p> <p>9 Q. And you reported to Ms. Wright that your wife's</p> <p>10 auto is also flooded in the driveway?</p> <p>11 A. Yes. And -- and my Yukon and my truck were</p> <p>12 flooded at the time, also. We couldn't get anything</p> <p>13 out.</p> <p>14 Q. So how many vehicles did you have in the</p> <p>15 driveway?</p> <p>16 A. Three. Actually, four. My neighbor brought</p> <p>17 his over.</p> <p>18 Q. Did he bring his over because your --</p> <p>19 A. Higher than he was.</p> <p>20 Q. You're higher. Okay.</p> <p>21 A. Across the street.</p> <p>22 THE REPORTER: Will you just try to wait</p> <p>23 until she finishes?</p> <p>24 THE WITNESS: I'm sorry.</p> <p>25 THE REPORTER: You're okay.</p>	<p style="text-align: right;">Page 64</p> <p>1 related to the FEMA relief.</p> <p>2 A. Yes. And we never got a response.</p> <p>3 Q. (BY MS. TARDIFF) And in terms of making the</p> <p>4 application, was that something you did or did your wife</p> <p>5 do it?</p> <p>6 A. Peggy did it.</p> <p>7 Q. Okay. And did your wife also take care of</p> <p>8 submitting the claim on flood insurance?</p> <p>9 A. Yes.</p> <p>10 Q. Did you have a flood insurance adjuster come</p> <p>11 out to your home at some point to inspect the property?</p> <p>12 A. Yes.</p> <p>13 Q. And did you meet with the adjuster?</p> <p>14 A. Yes.</p> <p>15 Q. Was it a man or a woman, do you recall?</p> <p>16 A. Both.</p> <p>17 Q. Both. Okay. All right.</p> <p>18 And can -- did you accompany them on their</p> <p>19 inspection of your home?</p> <p>20 A. Yes.</p> <p>21 Q. Okay. And can you walk me through that</p> <p>22 inspection and what you -- or do you recall when the</p> <p>23 inspection was?</p> <p>24 A. The 9th or 10th. When we were cleaning out the</p> <p>25 house, they arrived and stayed with us for about a day.</p>
<p style="text-align: right;">Page 63</p> <p>1 (Exhibit 7 marked.)</p> <p>2 Q. (BY MS. TARDIFF) All right. Mr. Hollis, I've</p> <p>3 given you what we've marked as Hollis Deposition</p> <p>4 Exhibit 7. The Bates Number is Hollis 00782. This is a</p> <p>5 printout of an e-mail from you, again, to Lilla Wright</p> <p>6 at Allstate, Monday, September 4th, 2017, at 6:14 p.m.</p> <p>7 Do you recall this e-mail?</p> <p>8 A. Yes.</p> <p>9 Q. And it sounds like you had regular</p> <p>10 communications with Ms. Wright during this whole ordeal.</p> <p>11 A. Yes.</p> <p>12 Q. And at this point you're reporting to her that</p> <p>13 your home still has 22 inches of water in it?</p> <p>14 A. Correct.</p> <p>15 Q. But you had not been back since Saturday.</p> <p>16 A. Correct.</p> <p>17 Q. So how -- how did you know your home still had</p> <p>18 22 inches of water in it as of Monday?</p> <p>19 A. I don't recall. I think one of my neighbors</p> <p>20 went back in there and told us.</p> <p>21 Q. Now, once you evacuated and moved to your son's</p> <p>22 house, did you or your wife apply to FEMA for Hurricane</p> <p>23 Harvey-related relief?</p> <p>24 MR. HARTMAN: I'm just going to note for</p> <p>25 the record our objection to relevance for everything</p>	<p style="text-align: right;">Page 65</p> <p>1 Q. Okay. All right. And can you -- can you</p> <p>2 walk -- did you accompany them then on the inspection</p> <p>3 that day?</p> <p>4 A. Well, I showed them what it was. And then we</p> <p>5 were cleaning me out, and they continued to do what they</p> <p>6 measured and all that.</p> <p>7 Q. And did they have specific questions for you</p> <p>8 about -- about the damage they were tracking or</p> <p>9 documenting?</p> <p>10 A. They were looking at it.</p> <p>11 (Exhibit 8 marked.)</p> <p>12 MS. TARDIFF: I actually don't have an</p> <p>13 extra copy of this one. I apologize.</p> <p>14 Q. (BY MS. TARDIFF) What we've marked as Hollis</p> <p>15 Deposition Exhibit 8, the Bates is Hollis 00769.</p> <p>16 MS. TARDIFF: We can note, Counsel, a</p> <p>17 standing objection to questions about flood insurance.</p> <p>18 Q. (BY MS. TARDIFF) And, Mr. Hollis, do you</p> <p>19 recognize this document?</p> <p>20 A. Yes.</p> <p>21 Q. And can you tell me what it is?</p> <p>22 A. It's our flood insurance policy.</p> <p>23 Q. Okay.</p> <p>24 A. Proof of loss.</p> <p>25 Q. Proof of loss.</p>

John Britton

July 16, 2018

Page 1

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE: UPSTREAM ADDICKS)

AND BARKER (TEXAS))

3 FLOOD-CONTROL RESERVOIRS)

4) CASE NO. 17-cv-9002L

5 THIS DOCUMENT RELATES TO:)

6 ALL DOWNSTREAM CASES)

7
8 ORAL DEPOSITION

9 JOHN BRITTON

10 30(B)(6) MEMORIAL SMC INVESTMENT 2013, LP

11 JOHN BRITTON

12
13 ORAL 30(b)(6) DEPOSITION OF JOHN BRITTON,
14 Memorial SMC Investment 2013, LP, produced as a
15 witness at the instance of the JOHN BRITTON and duly
16 sworn, was taken in the above-styled and numbered
17 cause on the 16th day of July, 2018, from 9:10 a.m.
18 to 2:19 p.m., before Shauna Foreman, Certified
19 Shorthand Reporter in and for the State of Texas,
20 reported by computerized stenotype machine at the
21 offices of Vinson & Elkins, 1001 Fannin, Suite 2500,
22 Houston, Texas, pursuant to the Federal Rules of
23 Civil Procedure and the provisions stated on the
24 record or attached hereto.
25

John Britton

July 16, 2018

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<p>1 know whether it was pulled together or what, but I</p> <p>2 think it was something that you were working with in</p> <p>3 preparing for your deposition here today; is that</p> <p>4 correct?</p> <p>5 A. Correct.</p> <p>6 Q. There's no Bates stamp number on it.</p> <p>7 What's that document?</p> <p>8 A. This document is a list of the</p> <p>9 subcontractors and the value of their contracts and</p> <p>10 purchase order logs and the values of those purchase</p> <p>11 order logs between Grayco Builders and the various</p> <p>12 subcontractors working on the repair of Parkside at</p> <p>13 Memorial.</p> <p>14 Q. So these aren't totaled -- so for what time</p> <p>15 period?</p> <p>16 A. This is for the rebuild. So that contract</p> <p>17 was entered into probably in December of 2017.</p> <p>18 MR. McNEIL: It corresponds to</p> <p>19 Number 12 on your deposition notice.</p> <p>20 MR. DAIN: Okay. Thank you.</p> <p>21 Q. (BY MR. DAIN) Number 12 reads, "Entities</p> <p>22 involved in the remediation and their roles and</p> <p>23 responsibilities and background and experience."</p> <p>24 So just tell me again -- so these --</p> <p>25 what's the difference between the first table and the</p>	<p>1 superintendent who is out on the job, assistant</p> <p>2 superintendent. We hire contract labor, people to</p> <p>3 come in and clean things up. The burden of those</p> <p>4 salaries, all that stuff goes into the general</p> <p>5 conditions. Dumpsters, things that the other</p> <p>6 subcontractors aren't paying for that Grayco Builders</p> <p>7 is responsible for.</p> <p>8 Q. All right. And I guess I'm just trying to</p> <p>9 get a sense. Grayco Builders, using its own</p> <p>10 workforce, bills directly for that reconstruction</p> <p>11 work, as well, correct?</p> <p>12 A. The workforce that Grayco Builders uses is</p> <p>13 supervisory. Any labor that's doing manual labor is</p> <p>14 third-party contracted -- contracted labor. Grayco</p> <p>15 Builders does not have plumbers on its payroll, does</p> <p>16 not have -- the guys that are doing the cleanup out</p> <p>17 there typically are not Grayco Builders' employees.</p> <p>18 We hire them through a placement agency.</p> <p>19 Q. But there's a distinction in the accounting</p> <p>20 structure between those and individuals who are</p> <p>21 subcontractors?</p> <p>22 A. Absolutely, yeah.</p> <p>23 Q. Okay. I'm done with that document.</p> <p>24 What's your understanding about how</p> <p>25 well Parkside is doing in getting new tenants into</p>
Page 87	Page 89
<p>1 second table?</p> <p>2 A. Sure. The first table is lists of</p> <p>3 subcontractors who entered into a subcontractor</p> <p>4 agreement between Grayco Builders and these various</p> <p>5 companies.</p> <p>6 The second list is a purchase order</p> <p>7 log. So Grayco Builders buys product and some</p> <p>8 services under a purchase order structure as opposed</p> <p>9 to a subcontract structure.</p> <p>10 Q. And would it be then correct that all other</p> <p>11 costs of repair and rehabilitation would be costs by</p> <p>12 Grayco Builders itself?</p> <p>13 A. No. I'm not sure I would agree with that</p> <p>14 statement. This is a list of subcontracts and POs at</p> <p>15 some point in time. It's not dated, so I'm not sure</p> <p>16 if it's the beginning, if it's current.</p> <p>17 Q. Okay.</p> <p>18 A. And if you add these up, it's not going to</p> <p>19 add up to the full contract amount because --</p> <p>20 Q. I'm trying to understand the difference.</p> <p>21 A. So in addition to these costs, you're going</p> <p>22 to have the general conditions, which is the cost</p> <p>23 that Grayco Builders expends that are charged back to</p> <p>24 the job.</p> <p>25 For instance, the cost of the</p>	<p>1 the property?</p> <p>2 MR. McNEIL: Currently?</p> <p>3 MR. DAIN: Currently.</p> <p>4 A. Let me answer that in two parts. Parkside</p> <p>5 reopened in December of 2017, and that was triggered</p> <p>6 by the City of Houston giving us permission to</p> <p>7 reoccupy the upper floors. And we had to replace --</p> <p>8 we had to do a lot of work to get there, but we got</p> <p>9 that done by December 20th.</p> <p>10 What we did not have is any of the</p> <p>11 common area amenities. Access to the pools was not</p> <p>12 allowed, the fitness center was not usable, the</p> <p>13 leasing office and all those amenities were --</p> <p>14 resident rooms, none of those were open.</p> <p>15 So from December through May, the</p> <p>16 leasing -- it was tough. I mean, we managed to gain</p> <p>17 some occupancy. We had a lot of residents who lived</p> <p>18 there before that came back. I say a lot. A few.</p> <p>19 But it was difficult to achieve even by offering</p> <p>20 additional incentives, rent concessions for -- in</p> <p>21 exchange for not having amenities and common areas.</p> <p>22 From the end of May, beginning of June</p> <p>23 when we opened the office, it has -- leasing has</p> <p>24 improved. So is it going great? I don't know if I</p> <p>25 would say it's going great. It's going good.</p>

23 (Pages 86 - 89)

John Britton

July 16, 2018

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1 Q. (BY MR. DAIN) Is there any indications
2 that -- that there is a resistance to leasing in the
3 building because of the Harvey flood?

4 A. Well, we haven't -- and I mentioned before,
5 I'm not sure if we have anybody living on the first
6 floor yet. I'm not sure we've leased any first-floor
7 units.

8 Q. Understood.

9 A. If you're talking about being impacted by
10 the flood, that would be the first line of water
11 entry. We've received a lot of questions -- we've
12 had residents ask for elevation certificates so they
13 can get insurance, including flood insurance.

14 So I'm not answering your question
15 directly. They're -- residents are aware that the
16 property flooded, new residents coming in.

17 Q. Understood, and I'm -- and I appreciate the
18 response.

19 Have you heard from any of the folks
20 that are, I guess, front line in the effort to fill
21 the tenants back up that there is -- there are people
22 that are saying, "I won't" -- words to the effect "I
23 don't want to be here because of the prior flood"?

24 A. Well, we've had people who moved out
25 because of the flood and didn't come back. Keep in

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1 mind, for every visitor to the property, prospective
2 resident, you typically in the apartment industry --
3 or at least at our class of apartments, you typically
4 close about 20 percent of the traffic. That means
5 eight out of every 10 who come into your property
6 don't lease from you. Is it because we flooded? Is
7 it because they don't like the manager? You know,
8 that's hard for me to answer.

9 Q. Let me just back up. I'm about to talk to
10 you about Harvey, but you talked a little earlier
11 about the permission to reoccupy in December --
12 December 20.

13 Did the townhouse units get -- was
14 there -- did they also suffer an inability to occupy
15 and, if so, when was that released?

16 A. Yes, and the same date. So there's a
17 couple of factors involved. Initially, Friday after
18 the flood -- if Monday was the 28th -- 31st -- the
19 mayor issued a mandatory evacuation of all properties
20 within -- I can't give you the boundaries, but we
21 were right smack dab in the middle of it. By that
22 time, Centerpoint had cut off our power, as well. So
23 anybody who wanted to stay pretty much had to leave.
24 We did have one guy who was a, quote, unquote,
25 survivalist stay the whole time. We couldn't

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1 physically go pull him out.

2 The city issued a mandatory
3 evacuation. Sometime after that when the water came
4 down, the city, which had initially said they weren't
5 going to enforce a lot of code-related issues related
6 to moving back into the property, sort of had a
7 reversal of that and the city required us to meet
8 certain thresholds, which we had to do anyway.

9 For instance, the fire pumps. They
10 all stopped working. You can't have residents living
11 at a multi-story apartment without fire pump
12 pressure. We had to replace all of our transformers.
13 They are designed to stay underwater for, I think, 36
14 hours. But two weeks, no way. So even the
15 transformers that were working we had to replace
16 because you can't rely on those that were operating
17 the property.

18 Over and above that, the city in
19 certain instances required us to build back to a
20 higher code than we originally built to. I think we
21 built to 2011. We had to rebuild to 2016. They
22 wouldn't let us, in certain areas of the property,
23 for instance, pigtail into the existing electrical.
24 The wires that were underwater, they wouldn't let us
25 splice into them. But in other areas, they would.

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1 So in some areas, we had to completely rewire.

2 What was your question again? Sorry.

3 Q. I was trying to do what you were doing,
4 which was work backwards from the December reoccupy
5 opportunity to the loss of occupation. At least you
6 made that leap, so I'll follow you.

7 A. Right. So -- okay. I know where I was
8 going.

9 MR. McNEIL: Wasn't your question
10 dealing with the occupancy of the townhomes versus
11 the apartments, and he was explaining what all had to
12 be done in order to gain occupancy and why it all
13 happened at the same time?

14 A. So when we had to re-permit for these
15 higher codes and things like that, the city viewed
16 that as a permit over the entirety of the property
17 and they would not allow us to reoccupy until the
18 common area, like the electrical and the fire pump,
19 all those things were completed for the entirety of
20 the property.

21 So as a result, the reopening of the
22 property occurred simultaneous to the townhouses and
23 the flats. That was in terms of -- I take that back.
24 I'm not sure we had any of the -- the townhouses
25 actually available in December. So we could have --

24 (Pages 90 - 93)

John Britton

July 16, 2018

<p style="text-align: right;">Page 94</p> <p>1 if the units were rebuilt, I think we could have 2 moved people in, but I don't think we got the 3 turnover of the first townhouse until February. 4 Q. (BY MR. DAIN) They just -- while you had -- 5 you weren't legally prohibited from doing that. You 6 weren't physically ready for those folks? 7 A. We weren't legally prohibited as a property 8 level, but then they had individual permits on the 9 townhouse buildings that had not yet -- there wasn't 10 as much work on the townhouses, but it had to be 11 restored before people could move back in. 12 MR. DAIN: Off the record for a 13 second. 14 (Recess from 1:15 p.m. to 1:23 p.m.) 15 Q. (BY MR. DAIN) Bringing you to late 16 August 2017 and the Harvey storm begins, where are 17 you? Are you in Houston area? 18 A. I'm embarrassed to say on Saturday or 19 Friday, I decided it would be a good idea to take my 20 dog and 12-year-old to our house in Galveston and 21 watch the storm down there and got down there and was 22 stuck four or five days. 23 Q. Okay. So when did you return to Houston, 24 then? 25 A. I returned to Houston on Wednesday</p>	<p style="text-align: right;">Page 96</p> <p>1 with the residents who were still remaining, pleaded 2 with them to leave. At that point, the mandatory 3 evacuation had not been made by the city, but it was 4 deeply concerning that we were walking through the 5 property that was -- depending on the elevation, 6 10 -- you know, 5 and a half feet to 10 feet from the 7 street or the finished first floor. 8 So essentially the majority of the 9 first floor was submerged, yet the power was on to 10 the entirety of the property, which obviously creates 11 a hazard of unbelievable proportion. If there were a 12 fire, no fire department entity would be able to save 13 these people. 14 So we pleaded for them to leave. A 15 lot of them were dug in. We couldn't physically pull 16 them out of there and make them leave. But that's 17 what we witnessed on that Wednesday, sort of utter 18 devastation. 19 Q. Who from -- whether it be Grayco 20 Management, LLC or who from any of the Grayco 21 entities was present during the beginning of the 22 storm and during the initial days of flooding? 23 A. Well, primarily it was Lauren Smith, who 24 was the property manager. She resided at the 25 property. She resided on the first floor of the</p>
<p style="text-align: right;">Page 95</p> <p>1 following the storm. 2 Q. Okay. And when did you first visit 3 Parkside? 4 A. Wednesday, the 30th. 5 Q. And what did you observe on the 30th? 6 A. Well, we took a boat to the property, a 7 17-foot fishing boat, not a flat john boat. So we 8 were navigating a hull that went several feet into 9 the water. Pulled up to the northeastern corner of 10 the property, the corner on South Mayde Creek, kind 11 of pulled the boat up next to the apartment balconies 12 on the first floor and the second floor. 13 One of the individuals on the boat 14 jumped up and climbed up to the second floor from the 15 boat. So that's how high the water was. I, again 16 not making a very sound decision, decided to slide 17 off the boat into the first floor. First came down 18 on top of a fence between my legs, which was not very 19 smart. Pulled myself back up, slid down all the way 20 to the ground, and the water was up to about my chin. 21 Didn't have a life vest on, but I sort of forced 22 myself over to the stairs that led up to the second 23 story. 24 So made it up to the second story. We 25 at that point walked through the building, conversed</p>	<p style="text-align: right;">Page 97</p> <p>1 property. So all of her belongings were -- well, I 2 say all of her belonging were wiped out. She managed 3 to move some of her stuff up on Sunday evening to a 4 second or third floor unit, but she was there the 5 majority of the time until all the residents were 6 gone, all except the one we talked about who didn't 7 ever leave. 8 There was one individual in the back 9 of the property in a townhouse who said he wasn't 10 going anywhere. He stayed the whole time, and 11 actually we were in contact with him to make sure he 12 was okay and he was taking pictures and watching out 13 for the place. 14 MR. DAIN: I'll go ahead and have this 15 marked. 16 (Exhibit 17 marked) 17 Q. (BY MR. DAIN) I'm handing you what's been 18 marked Britton Exhibit Number 17. It's a series of 19 text messages. Because of the effort today to 20 reproduce these -- get copies of these documents here 21 and to get these documents in a correct order, 22 although the first page has a Bates stamp of 685, the 23 rest of them are not -- many of the others are not 24 Bates stamped. I'm not sure if any of them are. 25 Let me ask you: Have you seen that</p>

25 (Pages 94 - 97)

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
 ORAL DEPOSITION OF

8 ARNOLD MILTON

9 JULY 10, 2018
10 -----

11
12 ORAL DEPOSITION OF ARNOLD MILTON, produced as
13 a witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 10th day of July, 2018, from 9:02 a.m. to
16 2:48 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 When was the first time you returned to
2 your 850 Silvergate home?

3 A. The following Saturday. My son-in-law and I
4 went back in a boat with a pretty big outboard. And
5 like I say, when I turned into the front yard I fell off
6 the boat. And then he and I went into the house and the
7 water was up to here on me. And obviously it had been
8 higher based upon some of the stains on the wall. And
9 we wandered around the house and picked up whatever and
10 put it in plastic bags. I got my favorite boots, they
11 were floating solo up. And I use those to work in the
12 yard now.

13 But we took pictures. The refrigerator was
14 floating in the kitchen. The piano and a few other
15 pieces of furniture were under water in the living room.
16 And everything we put on tables was soaked,
17 unfortunately. We had stacked a lot of rugs and stuff
18 up there. And we had to have all -- all of that
19 cleaned. Stuff we could save, which was a couple of
20 pretty good-sized rugs, we had those cleaned. But we
21 stayed probably about 40 minutes and left.

22 Q. During that previous answer you said water was
23 about up to here and you pointed to your chest. Can you
24 estimate about how high that was?

25 A. However tall this is, I don't know. Whatever

1 what did the water in the home look like?

2 A. It was brownish, dirty looking.

3 Q. And how did it smell?

4 A. Bad. Smelled -- had a sewage tint to it.

5 Q. At that point was there any mold in your home?

6 A. You know, I don't remember the mold until we
7 got in there and started really stripping the walls
8 down. But I wasn't paying much attention to mold at
9 that time.

10 Q. What was the condition of the property upstairs
11 in your home on September 2nd?

12 A. Well, it was very humid. And the walls kind of
13 had lost their brightness. The carpet was kind of
14 grungy looking. But there wasn't much change other than
15 that. And without something to compare it to, it was
16 just a mental picture I had.

17 Q. Okay. After you left the house on the 2nd,
18 where did you go?

19 A. Well, we got in the boat. They came back and
20 picked us up and we went back to our son-in-law's house
21 and took what we had collected.

22 Q. When was the next time you returned to the
23 850 Silvergate home after September 2nd?

24 A. I'm pretty sure it was September the 10th. We
25 thought about going back on the 9th but we were --

1 because we were low on our block, there were already
2 people going into their homes on the 9th. But rather
3 than just go back and try to risk having the water down
4 enough to work, we went back on the 10th.

5 Q. And when you went back on the 10th, who was
6 with you?

7 A. My son-in-law. And I don't remember exactly
8 when his fraternity brothers and the crew came, but I
9 think it was mostly the next day. And the first thing
10 we had to do was pump out the living room. We had a
11 sunken living room, there's water still in it. So we
12 got one of these floor pumps and pumped that out. And I
13 believe there was power on when that happened.

14 And like I say, when they showed up they
15 were ready to go to work. They had already completely
16 stripped a couple of other homes for other friends, so
17 they knew exactly what they were doing. And they didn't
18 waste any time. And most of the time I was -- had a big
19 shovel, I was scooping up whatever they had stripped and
20 putting it in a wheelbarrow and wheeling it out front
21 and dumping it on the pile; that was basically my job.
22 Which was kind of a blessing because I didn't have to
23 see what they were doing to the house or my stuff. But
24 basically they just took it down.

25 Q. When --

1 Q. Has your congressperson held meetings, public
2 meetings following Harvey?

3 A. I believe he has. I haven't been to any of
4 them.

5 Q. Have you dealt with -- is it Mr. Culberson?

6 A. John Culberson, yes.

7 Q. Have you dealt with John Culberson personally
8 since Harvey?

9 A. No. I have met him face-to-face before. I
10 went to a couple of meetings because I was kind of a
11 fair tax advocate. And that eventually just disappeared
12 into committees and U.S. Congress. And I went to a
13 meeting to ask him about that.

14 Q. When you say "fair tax advocate," what do you
15 mean?

16 A. I mean doing away with the income tax and
17 having a national sales tax so we don't have to keep up
18 with all of these receipts and paperwork. And that the
19 tax is paid as it's due, and it doesn't become an
20 accounting nightmare. Or an enforcement nightmare the
21 way it is.

22 Q. Presently, what do you think your property can
23 be used for?

24 MR. HOBBS: Objection; goes to damages.

25 A. What's it being used for?

1 Q. (BY MR. LEVINE) Let me ask it differently.

2 Do you think your 850 Silvergate home can
3 still be used as a residence?

4 MR. HOBBS: Objection; goes to damages.

5 A. With repair, yes.

6 Q. (BY MR. LEVINE) Do you intend to continue
7 living in the home after it's repaired?

8 A. Yes.

9 Q. Do you know approximately when the repairs will
10 be completed?

11 A. Hopefully by the end of August. It's been
12 almost a year.

13 Q. Have you and your wife been living with your
14 daughter and her family that entire time?

15 A. Yes.

16 Q. Has it cost you anything to -- to live with
17 your daughter during that time?

18 MR. HOBBS: Objection; goes to damages.

19 A. We pay our fair share of food and whatever else
20 we do for entertainment. And I still owe my son-in-law
21 for the tools and hired help from the cleanup. So
22 that's pending.

23 Q. (BY MR. LEVINE) Have you paid any rent to your
24 daughter and son-in-law?

25 A. No.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 VIRGINIA MILTON
10 JULY 10, 2018
11 -----

12 ORAL DEPOSITION OF VIRGINIA MILTON, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 10th day of July, 2018, from 3:14 p.m. to
16 5:00 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 government took your entire real property interest?

2 MR. HOBBS: Same objections.

3 A. Entire property would mean they took the whole
4 house and the land under it and all my goods. They did
5 destroy the whole lower floor to the -- and part of the
6 upper floor. Destroyed the land in the sense of all of
7 the yard and plants, so yes. And everything in it.
8 Some not replaceable.

9 Q. (BY MR. LEVINE) The -- your complaint alleges
10 that the government took both real property and personal
11 property permanently and temporarily. For the temporary
12 claim, are you alleging that the government took your
13 property for a particular period of time?

14 MR. HOBBS: Objection; form. And calls for
15 legal conclusions.

16 A. I don't know what you mean by "particular
17 period of time," unless it's the time that we're having
18 to be out of our house where -- while it's been
19 restored.

20 Q. (BY MR. LEVINE) Do you know what the
21 approximate duration the flood waters were in your home?

22 A. At least two weeks. From the time that the
23 flood -- the flooding stopped. It doesn't mean that it
24 couldn't have been in there more. But after the storm
25 had subsided, we couldn't go back into our home for two

1 THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE: DOWNSTREAM ADDICKS)
2 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
4) SUB-MASTER DOCKET NO.
5) 17-CV-90021
6)

7 *****

8 ORAL DEPOSITION OF

9 JENNIFER SHIPOS

10 September 19, 2018

Volume 1

11 *****

12 ORAL AND VIDEOTAPED DEPOSITION OF JENNIFER SHIPOS,
13 produced as a witness at the instance of the DEFENDANT,
14 was taken in the above-styled and numbered cause on
15 September 19, 2018 from 3:02 p.m. to 5:05 p.m., before
16 Toyloria Lanay Hunter, CSR in and for the State of
17 Texas, reported by machine shorthand, at the law offices
18 of NEEL, HOOPER & BANES, P.C., 1800 West Loop South,
19 Suite 1750, Houston, Texas 77027, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto.

1 photographs on the interior of your house.

2 A. Okay.

3 Q. The next photograph, 000230, what's portrayed
4 in that photograph?

5 A. This is my hallway. And I have an antique
6 hutch here in the entrance way.

7 Q. How deep was the water there, if you know?

8 A. I would say it's probably around at that time,
9 12 to 15 inches.

10 Q. Okay. And what do you base that on?

11 A. I think I just recall it being -- I think we
12 tried to mark all the watermarks on it.

13 Q. How long did it take the water to recede from
14 the interior of the house?

15 A. Six days.

16 Q. After the six days, do you remember seeing any
17 watermarks on the walls?

18 A. Yes.

19 Q. Was that all around the first floor?

20 A. Yes.

21 Q. And in the garage?

22 A. Yes.

23 Q. Did you have any watermarks in the exterior of
24 the house?

25 A. Yes.

1 --

2 MR. DOOHER: The fax sheet?

3 BY MR. BANES:

4 Q. Exhibit 11. Let's turn back to Exhibit 11,
5 ma'am. All right. Now, all right.

6 Now, you left -- when did you leave the
7 house, ma'am?

8 A. 10:00 a.m.

9 Q. 10:00 a.m. on what day?

10 A. On the 28th.

11 Q. 10:00 a.m. on the 28th?

12 A. Yes.

13 Q. All right. And do you know -- so where -- how
14 did you figure out that flood waters didn't come on the
15 property until the 29th?

16 A. Well, I told you, we walked to our neighbor's
17 house; which is, I don't know, about a mile to our
18 house. The next day we got up and we waded through the
19 water. And so at that point, it had water in the house.

20 Q. On the 29th?

21 A. On the 29th.

22 Q. And so now, had there been any water -- now,
23 at least when you left on the 29th, there was no water
24 in the house?

25 A. There was no water in the house.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF
9 PETER SILVERMAN
10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF PETER SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 9:06 a.m. to
16 3:52 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.

1 did you talk with anyone else about your document
2 collection?

3 A. No one other than my wife.

4 Q. Okay. Did you do any independent research?
5 Did you look at any websites online?

6 A. Not -- not at that time.

7 Q. Okay. Prior to -- so -- so fast forwarding
8 from March until just, you know, prior to this
9 deposition, and going back to what you did to prepare
10 for this deposition, other than speaking with your
11 attorney, did you do anything else?

12 A. Other than --

13 Q. To prepare.

14 A. -- again, to look through to see if I could
15 find anything that could be considered responsive. I
16 did another review.

17 Q. All right. Can you let -- can you state for
18 the record where you reside right now?

19 A. I reside in an apartment called Modera Energy
20 Corridor located at 14520 Briar Forest Drive. We live
21 in Apartment 5213. It's the same ZIP Code that our home
22 was in, Houston, Texas 77077.

23 Q. Okay. And how long have you lived in this
24 apartment?

25 A. Since September of 2017.

1 Q. So you -- you moved there after your home was
2 flooded?

3 A. We moved there in September. We sort of moved
4 in and then took a vacation, and so we didn't
5 actually -- right when we moved there, we didn't
6 actually sleep there for a few weeks. So we moved first
7 and then started staying at the apartment.

8 Q. Where did you go on vacation?

9 A. We went on a cruise, a transatlantic cruise,
10 that started in South Hampton and ended in Fort
11 Lauderdale.

12 Q. That sounds nice.

13 A. It was -- it was very nice. It was. The irony
14 was anyone we met said, "Oh, you're from Houston. Good
15 thing -- good thing you weren't affected."

16 Q. So going back -- let's go back a few -- I don't
17 want to judge your age, but let's go back a few decades.

18 A. You can judge my age.

19 Q. When did you graduate from high school?

20 A. 1980.

21 Q. Okay. And where did you go to high school?

22 A. In Connecticut. The name of the school is the
23 Loomis Chaffee School. It's a private school in
24 Connecticut. I went there for two of the four years of
25 high school. I graduated -- that's where I graduated

1 Q. (BY MS. IZFAR) Mr. Silverman, at your closing
2 when you purchased your home, did the sellers provide
3 any disclosure about preexisting flooding or any
4 flooding that had occurred beforehand?

5 A. No.

6 Q. Did their agent provide you any disclosures?

7 A. I knew nothing about prior flooding.

8 Q. Okay. So I want to talk to you a little bit
9 about drainage on your property.

10 What happens when it rains?

11 MR. HODGE: Objection; form.

12 Q. (BY MS. IZFAR) You can answer. If you need
13 more clarification, I can provide it. Yeah.

14 A. When it rains water drains to the street from
15 our -- from our property.

16 Q. Do you have a sewer system on your property at
17 all?

18 MR. HODGE: Objection; form.

19 Q. (BY MS. IZFAR) Do you have a sewer opening at
20 the curb at your -- I mean, at the curb when you exit
21 your property?

22 A. There is no storm sewer opening in front of my
23 house.

24 Q. Okay. Where is the nearest storm sewer
25 opening?

1 would all be together. And that's where I went on the
2 27th as well.

3 Q. Okay. So you spent the night with your sister,
4 did you say, on the 27th?

5 A. Sister-in-law.

6 Q. Okay. Where do they live?

7 A. Jersey Village neighborhood.

8 MRS. SILVERMAN: Laurel Creek.

9 Q. (BY MS. IZFAR) Okay. So then -- so you took
10 some pictures on the 27th at around 4:53, 5:00 o'clock?

11 A. Correct.

12 Q. And then -- and then when did you leave?

13 A. Right after I took the pictures.

14 Q. Right after?

15 A. And I don't recall if I went back in the house
16 or I took these and then just got in and left.

17 Q. Okay. And then when did you return?

18 A. September 8th.

19 Q. Did you -- you didn't return any time before
20 September 8th?

21 A. No. It was impossible to after -- after we
22 left to come back in. And I think the mandatory
23 evacuation that was allowing homeowners back in would
24 only allowed us back in on the 8th. And we had to show
25 ID that we owned the property there. The National Guard

1 protected the entrance to the neighborhood.

2 Q. Okay. Why did you decide to leave at around
3 5:00 p.m. on the 27th?

4 A. Because the electricity had not turned back on.
5 It had gone out approximately maybe 1:00 or 2:00 o'clock
6 in the afternoon. And I was by myself. And three hours
7 without TV or internet and no air-conditioning was
8 clearly long enough for me to feel like, Let me go to my
9 sister-in-law's house.

10 Q. Okay. So did -- do you know why the power went
11 out?

12 A. It would be speculation of why. But it
13 wasn't -- it was not a local issue at my house.

14 Q. Okay. When you say "it was not a local issue,"
15 do you mean that the entire neighborhood's power was
16 out, or more than one -- sorry.

17 Do you mean that more than your house did
18 not have power?

19 MR. HODGE: Objection; form.

20 A. I mean that, and I mean that I believe for
21 safety reasons, in anticipation -- I don't know. It
22 would be speculation for me to say why the electricity
23 was turned off. But I believe the electricity was
24 actually turned off, that it didn't go out.

25 Q. (BY MS. IZFAR) Understood. So when you went

1 A. I don't know. I don't know. When we were able
2 to get back in on the 8th and then the 9th, that
3 appeared to be the first time that anyone was able to
4 come in. So I don't know of anyone who stayed in their
5 house during this event who I would even be able to ask
6 that.

7 Q. You mentioned earlier that Nick visited the
8 area on August 31st -- August 30th and August 31st?

9 A. Yes, I believe that to be the case, that he
10 visited both days.

11 Q. Do you know when he visited next after
12 August 31st?

13 A. I do not know when he visited after the 31st
14 or when he ultimately moved back into his house.

15 Q. Okay. You have not moved back into your home?

16 A. Correct.

17 Q. Why is that?

18 A. Because it was destroyed in the flood and has
19 not been rebuilt.

20 Q. Have you taken any remediation steps?

21 A. Yes.

22 Q. What steps? Can you walk me through all of the
23 steps that you've taken?

24 A. As soon as we can, we removed all of the wet
25 carpeting and anything that -- furniture, clothing,

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF
9 ZHENNIA SILVERMAN
10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF ZHENNIA SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 4:05 p.m. to
16 5:34 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.

1 downward into the street?

2 A. It was -- it went up to our courtyard. So from
3 our courtyard, it would have been level. And I guess it
4 went a little bit down. But, I mean, that's the natural
5 grading of just our front yard, is that it slopes down.

6 Q. Okay. Okay. So I believe your husband
7 testified that during Hurricane Harvey you were out of
8 the country; is that correct?

9 A. Yes.

10 Q. Where were you?

11 A. I was in Paris for work. And I was supposed to
12 return on the 28th.

13 Q. And when did you return?

14 A. The airports didn't open up until
15 September 3rd, I believe, and I got one of the first
16 flights out. And I flew via London to Houston. It was
17 one of the first direct flights.

18 Q. Okay. And when you got to Houston, where did
19 you go?

20 A. To my sister's.

21 Q. Okay. And is that where your husband was
22 staying?

23 A. Uh-huh.

24 Q. And then did you visit your home,
25 12515 Westerley Lane?

1 A. It was not until -- I mean, so I came back and
2 I went to work. And then it would have been, I believe,
3 this Friday or Saturday -- it would have been this
4 Friday, I think the 8th -- September the 8th. And we
5 had wanted to get back into the neighborhood, but we
6 weren't allowed.

7 And we had to drive basically to 59 to
8 come -- we just couldn't get to our neighborhood since
9 we couldn't get -- come through I-10. So -- so that was
10 the first day that we did it. And I think we had to
11 drive like really far out and come back. And then one
12 of my coworkers, the secretary for our team, insisted on
13 coming to help and so -- sorry.

14 Q. No, I understand. It's a very emotional
15 experience that you went through; a very traumatic
16 experience.

17 A. She's probably one of the only people that I
18 would have trusted to see our home in that state.

19 Q. I'll back up a little bit. So you came back on
20 September 3rd and you went to your sister's home?

21 A. Uh-huh.

22 Q. Did you talk to anyone -- any of your neighbors
23 about your home?

24 A. No. At this point, I didn't. I didn't talk to
25 anyone anymore. I had e-mailed with Nick from Paris. I

1 had sort of initiated those e-mails with Nick and asked
2 him -- when I talked to my husband he said he could no
3 longer get back to the house because of the water
4 release; that there was no way to get back. And so I
5 had Nick's e-mail address.

6 And so I -- I was so desperate at that
7 point because my work had finished and I couldn't get
8 home and I had nothing to do but watch the news. And so
9 I e-mailed Nick. And then Nick was like, you know, I'm
10 coming -- I'm going to go to the house, and so I will --
11 you know, I'll take photos and send them to you.

12 Q. Okay. So did Nick send you and your husband
13 photos together?

14 A. No. He would have sent them to me directly.

15 Q. Okay. Do you -- during Peter's deposition we
16 looked at a bunch of photos that Nick had taken. Did
17 Nick send you any other photos?

18 A. No, that's all he sent. And then I immediately
19 forwarded them to my husband.

20 Q. Okay. I understand.

21 A. Right.

22 Q. So those photos that we looked at were photos
23 that Nick had sent to you?

24 A. Right.

25 Q. Okay.

1 MS. TARDIFF: I think it's 13.

2 MS. IZFAR: Yeah.

3 A. It's a photo of Nick's house that we took I
4 think on the first day that we were able to get back
5 into the house.

6 Q. (BY MS. IZFAR) Okay. So I believe it's
7 Exhibit 13, Bates number Silverman 00013.

8 A. Right. I think -- I think. I mean, that's my
9 recollection because it is not included in any of these
10 e-mails from Nick. And when I saw it earlier today, I
11 noticed that the sun was shining and it made me think
12 that. Unless maybe Nick had texted that to my husband
13 directly, but I do not recall that being sent to me
14 ever.

15 Q. Okay. So when you went back to your home on
16 September 8th, do you recall seeing this kind of
17 standing water?

18 A. There was -- I don't particularly remember
19 Nick -- but I do know that standing in my driveway
20 facing the street there was a current in the water. And
21 some of the ducks -- displaced ducks from the lake
22 section were just walking around on the grass across the
23 street from us.

24 Q. Okay. So could you mark in orange that you
25 believe this picture might have been taken on the 8th?

1 the water is?

2 MR. HODGE: Objection; form.

3 A. No. I remember one of the first ones that I
4 looked at was of our front door where we've got this
5 elephant that we bought in Indonesia with a pot on top
6 of it. And as I looked inside the house through those
7 glass doors, it appeared -- appeared to me at that time
8 that the water had risen up to the level of the armrest
9 on the chair. And I remember talking to my husband
10 about it. And so that was -- and then of course seeing
11 my mailbox that was pretty --

12 Q. (BY MS. IZFAR) So right now just to be clear
13 for the record, you're looking at the second to last
14 page of the Exhibit 23, and you're looking at the --

15 A. The third.

16 Q. Wait. The third image which is IMG --
17 captioned "IMG_0846.jpg"?

18 A. Uh-huh. That's correct.

19 Q. Okay. And is it your understanding that these
20 pictures were also taken on August 31st by your neighbor
21 Nick?

22 A. Correct.

23 Q. All right. Did you have any other photographs
24 of your -- of your home between August 27th and
25 September 8th?

1 A. No. But being stuck in a hotel room and just
2 surfing the internet, I found some YouTube videos and
3 was able to see, like, somebody in a little motorboat
4 going down our street and in other streets in our
5 neighborhood. And I can't remember, but he had a name
6 like Cray man or something like that. And he had taken
7 video of our neighborhood, YouTube videos, and had
8 posted them.

9 Q. Do you think you might be able to find those
10 YouTube videos again and send them to your attorney?

11 A. I might be able -- yeah, I might be able to
12 look for them.

13 Q. If you're able to find them, we call for the
14 production of those videos.

15 A. Okay.

16 Q. You mentioned that you were in a hotel room,
17 when did you check in to a hotel?

18 A. Oh, no. I was -- this is -- because all of
19 these e-mails were while I was still in Paris.

20 Q. Got it. Understood. Understood. So when did
21 you move from your sister's home to your current home?

22 A. We -- prior to -- to our house being flooded,
23 we had planned -- and this is like months before -- my
24 father-in-law was turning 90 and we had planned a trip.
25 He likes to cruise and so we had planned a cruise with

1 him. And I really wanted to cancel it, and my husband
2 convinced me that we shouldn't. And so we -- I wanted
3 to stay in our general area because I wanted to be close
4 to the house and, you know, just to everything that I
5 know, which is near our home.

6 So there was an apartment complex near my
7 son's school and we were pretty desperate at that point,
8 you know, I mean, nobody likes to be living with
9 somebody else. And I had just my -- you know, I had so
10 much luggage from our trip to Paris, and my husband had
11 a backpack. And we just didn't -- I mean, I love my
12 sister, but it wasn't our home. You know, and everybody
13 is different. And so we really felt pressure. I mean
14 we pressured ourselves to try and get out, you know.

15 And so we -- I think we arranged sort of a
16 very quick move. And, I mean, we looked for an
17 apartment. And then we went on our trip. And I think
18 we moved in as soon as we got back or maybe even right
19 before we left, I don't remember.

20 Q. So mid-September?

21 A. Yes.

22 Q. And I believe your husband testified that the
23 apartment was named Modera?

24 A. Modera, uh-huh, Energy Corridor. And we took
25 an apartment on the second floor.

1 Q. And do you agree with his assessment that you
2 are still in a place where you're deciding whether to
3 renovate and move back or sell your house?

4 A. We -- I think ideally we would -- I mean, I
5 love my neighborhood and I would love to rebuild and
6 we've talked about it. But my husband's currently
7 unemployed, and so it's very hard for us to take on a
8 mortgage at this point and, you know, redo our home the
9 way that we want it. I mean, we just, you know, we need
10 a little bit more financial stability I think before we
11 can make that type of commitment. And we have looked
12 for houses but, you know, they're -- I mean, our lots
13 were big. You know, everything now is just like these
14 little cookie-cutter houses and they all look the same
15 and it's -- so anyway...

16 Q. So have you gotten estimates from contractors
17 as to how much it would cost to rebuild the home?

18 A. I think my husband had talked to somebody at
19 one point. And the only thing I remember from that
20 conversation was that it was a lot more per square foot
21 than we were willing to commit to at the time.

22 Q. And then -- so do you have any plans to move
23 out of your current home?

24 A. You know, I would love to move out of our
25 current home -- I mean out of our current apartment.

1 But as I mentioned earlier, I really hate house hunting.
2 And so it's sort of a little bit of a safe haven for us
3 right now. And it -- I mean, we definitely will have to
4 move out at some point. Our apartment lease is up in
5 September and I don't know if we'll renew for another
6 year or not.

7 Q. So of the money that you've received from FEMA,
8 do you have an understanding of how much is left for
9 repairs?

10 A. It is my understanding that we have not touched
11 very much of that, if anything at all. I think the
12 large check that we got, my husband sent it to the bank
13 or to whoever holds our mortgage. We have used some for
14 living expenses, but I mean, I think we -- we still
15 have, you know, a bit of it.

16 Q. Okay.

17 A. But I will also tell you that I don't deal with
18 the finances, so...

19 Q. Understood. Do you -- do you agree with your
20 husband's testimony as to the remediation work that was
21 done?

22 A. Yes. I know that we paid \$5,000. And I
23 thought we had paid extra for the mold or whatever it is
24 that they sprayed, but maybe not. So I think it's
25 5,000. I thought it was a little bit more than 5,000,

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM)
ADDICKS AND BARKER) Sub-Master Docket
(TEXAS) FLOOD-CONTROL) No. 17-cv-9002L
RESERVOIRS)

ORAL DEPOSITION OF
TIMOTHY STAHL
SEPTEMBER 5, 2018

ORAL DEPOSITION of TIMOTHY STAHL, produced as a witness at the instance of the Defendant, and duly sworn, was taken in the above-styled and numbered cause on September 5, 2018, from 10:10 a.m. to 2:52 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of NEEL, HOOPER & BANES, P.C., 1800 West Loop South, Suite 1750, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

1 I -- I can look at the flood gauges and go, oh, yeah,
2 you know, by morning of the -- early, early, early
3 morning of the 28th, we're talking -- I was still in
4 Alaska and the sun was still up at midnight. But
5 midnight in anchorage was 3:00 a.m. Houston time.
6 There's a time difference. So some time in there, I
7 was pretty sure there was water in my house.

8 Q. All right. But, again, you weren't in touch
9 with any neighbors who --

10 A. Not until the next -- my neighbor at 269
11 called from Mexico asking if his house was on fire in
12 the morning. I said I have no idea, I'm in Denali.
13 I'm up in Alaska. I said, what about the guys in the
14 middle? Oh, they're in Argentina.

15 Q. All right. So no --

16 A. I couldn't tell you a specific time that the
17 water was there. I can tell you when we came back a
18 few days later, the water had receded outside of the
19 structure still just below the structure. It was --
20 it was close.

21 Q. And when you say just below the structure,
22 can you tell me what you mean by that?

23 A. Well, the back of the house is a pier and
24 beam of sorts and then, of course, you have the deck,
25 which is also on a pier, so the water was below that

1 but above the air-conditioning unit.

2 Q. Okay. So where the deck is elevated, you
3 still have water underneath that deck at that time?

4 A. Yes, ma'am.

5 Q. Okay. And then how long did it take for the
6 water to recede past the end of your structure?

7 A. I don't remember. For all the water to go
8 back to being a creek, it was, like, a couple of
9 weeks. It was very slow on the drainage. It was -- I
10 think it was rapid at first and then it slowed down.

11 Q. All right. And were you visiting your
12 property daily at that point?

13 A. Only in the sense of opening it up to get the
14 air out and to try and get things moved out to the
15 curb that we knew we weren't going to keep and we were
16 sorting things, oh, yeah, we can wash that off, until
17 we found out about that E. coli thing, and then we
18 just tossed all of that, too. They're still calling
19 me specialist on here, too, but I haven't been a
20 specialist for 20 years.

21 Q. That must have been -- maybe that was the
22 first time you had insurance with them.

23 A. I've had insurance with USAA for 20 years.
24 Different sorts and credit card.

25 Q. When you -- when you -- let me rephrase that.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE: DOWNSTREAM §
 ADDICKS AND BARKER (TEXAS) §
3 FLOOD-CONTROL RESERVOIRS §
4 vs. § SUB-MASTER DOCKET NO.
5 § 17-cv-9002L
6 THIS DOCUMENT RELATES TO: §
7 ALL DOWNSTREAM CASES §
 _____ §

8
9 ORAL DEPOSITION

10 MR. SHAWN S. WELLING

11 August 14, 2018

12
13 ORAL DEPOSITION OF MR. SHAWN S. WELLING,
14 produced as a witness at the instance of the United
15 States and duly sworn, was taken in the above-styled
16 and numbered cause on the 14th day of August, 2018,
17 from 9:22 a.m. to 3:52 p.m., before Michelle Hartman,
18 Certified Shorthand Reporter in and for the State of
19 Texas and Registered Professional Reporter, reported
20 by computerized stenotype machine at the offices of
21 Potts Law Firm, 3737 Buffalo Speedway, Suite 1900,
22 Houston, Texas 77098, pursuant to the Federal Rules
23 of Civil Procedure and the provisions stated on the
24
25 record or attached hereto.

<p style="text-align: right;">Page 82</p> <p>1 A. Yeah.</p> <p>2 Q. What's your understanding of how high</p> <p>3 the water is in this photo?</p> <p>4 A. This photo looks like the ceilings are</p> <p>5 about 12, 13 feet -- eight to ten. But I know it got</p> <p>6 higher than that. It's got to be at least eight</p> <p>7 feet. That's hard -- that's a hard decision. It</p> <p>8 certainly is a lot of footage, but I don't know.</p> <p>9 Q. So could you put a range on it? Do you</p> <p>10 think it's between six and eight?</p> <p>11 A. Yeah.</p> <p>12 Q. Okay.</p> <p>13 A. Yeah, six to ten would be -- would be</p> <p>14 safe.</p> <p>15 Q. In this photo you think the range is</p> <p>16 between six and ten?</p> <p>17 A. Yeah. And with the feeling that it is</p> <p>18 a lot higher. I know exactly how high it got on</p> <p>19 the -- I can tell you exactly from the exterior of</p> <p>20 the building. So wherever gets that, where exactly</p> <p>21 the water gets the highest.</p> <p>22 Q. And do you have an understanding as to</p> <p>23 the date and time that the water reached its highest</p> <p>24 point in your basement?</p> <p>25 A. I can give you a better judgment call</p>	<p style="text-align: right;">Page 84</p> <p>1 And then I think that night we went to</p> <p>2 bed and the next morning we woke up and the water was</p> <p>3 pretty substantial, maybe at its 50 percent capacity</p> <p>4 and --</p> <p>5 Q. 50 percent capacity --</p> <p>6 A. 50 percent capacity to flood after the</p> <p>7 first day. I am just telling you what I remember.</p> <p>8 Q. Uh-huh.</p> <p>9 A. And, of course, I video blogged --</p> <p>10 which I'm sure you guys have -- each thing, each day.</p> <p>11 Q. And we're going to get back to some of</p> <p>12 this --</p> <p>13 A. Yeah.</p> <p>14 Q. -- in greater detail. I just thought</p> <p>15 that I would set out the general parameters of the</p> <p>16 period of time where you weren't at the property just</p> <p>17 so -- when I ask some of these questions, if you're</p> <p>18 not there it was quite kind of fair and we understand</p> <p>19 the situation.</p> <p>20 So the morning after Harvey hit -- and</p> <p>21 you're not sure of what date that is?</p> <p>22 A. Uh-huh.</p> <p>23 Q. -- you did not visit the property again</p> <p>24 until what day?</p> <p>25 A. After Harvey hit, the morning after</p>
<p style="text-align: right;">Page 83</p> <p>1 based off of what the exterior was because I saw that</p> <p>2 personally. When this photo was taken, I can't be</p> <p>3 specific. When it was uploaded this was here, but</p> <p>4 this was taken by my brother-in-law --</p> <p>5 sister-in-law -- my brother, or my brother's wife</p> <p>6 sent to me -- I couldn't get to this location. So</p> <p>7 whether I held on for a day or two or post, it could</p> <p>8 have been a day-and-a-half after. This is very</p> <p>9 vague. All I know is when I finally got to the</p> <p>10 property where the water was and where I could see a</p> <p>11 where the water line was.</p> <p>12 Q. Let's set a little foundation on this</p> <p>13 because that would be a fair thing to do.</p> <p>14 When was the last time you were at the</p> <p>15 property -- at the test property -- before you ended</p> <p>16 up having to spend a period of time over at your</p> <p>17 residence?</p> <p>18 A. The morning after Harvey hit.</p> <p>19 Q. So would that be the 25th?</p> <p>20 A. If Harvey had already hit landfall, I</p> <p>21 was there, at the property site. If I remember</p> <p>22 correctly the morning after Harvey hit, everything</p> <p>23 was fine. My wife started getting supplies for the</p> <p>24 apartment. And I thought, this is ridiculous; she,</p> <p>25 fortunately, did not and got some supplies.</p>	<p style="text-align: right;">Page 85</p> <p>1 that. In fact, it was that night that the water --</p> <p>2 the rain -- the next day I presume is when all the</p> <p>3 flooding occurred; is that correct? Isn't that when</p> <p>4 the water took over?</p> <p>5 Q. I'm not too sure what those phrases</p> <p>6 mean?</p> <p>7 A. Okay.</p> <p>8 Q. So here's -- you know, August 28 we</p> <p>9 have this posting?</p> <p>10 A. That's -- and keep in mind that's when</p> <p>11 I posted it.</p> <p>12 Q. Right.</p> <p>13 A. It doesn't have any relevance to that,</p> <p>14 being like that.</p> <p>15 Q. No, but as of --</p> <p>16 A. That is before that date.</p> <p>17 Q. As of August 28 you hadn't gotten back</p> <p>18 to the property yet, correct?</p> <p>19 A. That's correct. We can presume that on</p> <p>20 August 28th I have not gone back to the property.</p> <p>21 Q. So that is why I was referencing the</p> <p>22 date here, to try to --</p> <p>23 A. Sure, I buy that.</p> <p>24 Q. And so if this -- so if by this date</p> <p>25 you're not back at the property, can you tell me what</p>

<p style="text-align: right;">Page 86</p> <p>1 day you did get back to the property?</p> <p>2 A. Hmm, well, let's see. No, I can't. I</p> <p>3 am trying to think if there is any evidence.</p> <p>4 Q. Well, let's do this -- go ahead,</p> <p>5 finish.</p> <p>6 A. I remember at some point, against the</p> <p>7 desire of my wife, I drove out of the -- one night</p> <p>8 because the pig was drowning, and my brother had</p> <p>9 gotten the pig who was downing and gotten him out of</p> <p>10 the water and put it into a crate. It's not like</p> <p>11 it's a farm pig. It's like a dog to us.</p> <p>12 Q. I met him.</p> <p>13 A. Okay. That's right. So I got my Jeep</p> <p>14 and my Jeep was -- the hood was underwater when I was</p> <p>15 driving and I got there that night to check on the</p> <p>16 pig. So the water was still in a bad scenario, and</p> <p>17 then I drove back and went underwater again and got</p> <p>18 back up for few brief -- a few minutes, and only to</p> <p>19 go in the entrance and check on the pig, so not to</p> <p>20 scoot around, because it was just too dangerous.</p> <p>21 Q. And was that -- so did you enter into</p> <p>22 the building?</p> <p>23 A. The front foyer, yeah, where the pig</p> <p>24 was left.</p> <p>25 Q. Okay. And do you recall whether that</p>	<p style="text-align: right;">Page 88</p> <p>1 either -- it had to have been late at night. I --</p> <p>2 yeah. Because I remember it being dark.</p> <p>3 Q. Okay. So it is at night. And now a</p> <p>4 date, do you know the date?</p> <p>5 A. I don't. I would estimate we were</p> <p>6 probably -- the water was just beginning to recede.</p> <p>7 Q. Okay.</p> <p>8 A. Maybe four days -- three or four days</p> <p>9 after, maybe four days after the flood occurred.</p> <p>10 Q. All right.</p> <p>11 A. It was just enough for me to get my</p> <p>12 Jeep out but not enough for me to leave my wife alone</p> <p>13 and not enough to be on premises where there was no</p> <p>14 electricity, no Internet.</p> <p>15 Q. Now, you did -- you did do a Facebook</p> <p>16 post during some visit when you came back.</p> <p>17 Was that when -- and was that your</p> <p>18 first visit back to the property after this visit at</p> <p>19 night?</p> <p>20 A. Are you talking about Facebook posts,</p> <p>21 video or photo?</p> <p>22 Q. Video.</p> <p>23 A. Okay. I remember three prior to me</p> <p>24 getting to the premise.</p> <p>25 Q. Three Facebook posts?</p>
<p style="text-align: right;">Page 87</p> <p>1 visit was before or after --</p> <p>2 A. Oh, it must have been before this,</p> <p>3 yeah. I would imagine. I mean, of this, sorry,</p> <p>4 after that. After this.</p> <p>5 Q. So you do -- okay. That's helpful,</p> <p>6 thank you. So that was one visit?</p> <p>7 A. I'm sorry. I have to take this, excuse</p> <p>8 me, pardon me.</p> <p>9 (Discussion off record)</p> <p>10 THE WITNESS: I don't know who was</p> <p>11 calling me from this deal. Go ahead.</p> <p>12 Q. (BY MR. SALISBURY) At some point -- so</p> <p>13 you've identified one visit to the property.</p> <p>14 A. Uh-huh.</p> <p>15 Q. And you think it was after August 28th?</p> <p>16 A. Uh-huh.</p> <p>17 Q. And was it like early in the morning?</p> <p>18 A. Uh-huh.</p> <p>19 Q. And would it have been the morning of</p> <p>20 August 29?</p> <p>21 A. You mean when I visited the property</p> <p>22 for the first time?</p> <p>23 Q. Yeah. This one that you're --</p> <p>24 A. It was early in the morning. It would</p> <p>25 have been -- it was at night. So I think it was</p>	<p style="text-align: right;">Page 89</p> <p>1 A. Posts, three video Facebook posts --</p> <p>2 Q. Yes.</p> <p>3 A. -- prior to me actually getting on</p> <p>4 site?</p> <p>5 Q. Yes.</p> <p>6 A. That one late night, yeah.</p> <p>7 Q. And then there was a -- then you did a</p> <p>8 Facebook post?</p> <p>9 A. Oh, there was one on location.</p> <p>10 Q. On location?</p> <p>11 A. Oh, yeah. Yeah, I remember that. That</p> <p>12 was later, uh-huh.</p> <p>13 Q. And so my question was, then: Whether</p> <p>14 that visit that you videoed there was your first</p> <p>15 visit back to the property?</p> <p>16 A. No. I think there was that short visit</p> <p>17 to the pig.</p> <p>18 Q. Understood. So --</p> <p>19 A. A very quick visit.</p> <p>20 Q. But after the short visit for the --</p> <p>21 for the pig that we have discussed, would it have</p> <p>22 been your next visit that was --</p> <p>23 A. During the day. It was kind of day-ish</p> <p>24 and I was talking -- that's right. I was talking</p> <p>25 about the gas and all of that?</p>

<p style="text-align: right;">Page 222</p> <p>1 A. (Complies.)</p> <p>2 Q. So you made a little "X" up by Bayou on</p> <p>3 the Bend. Is that Bayou on the Bend actually the</p> <p>4 name of your complex?</p> <p>5 A. Uh-huh.</p> <p>6 Q. Okay. And would you make a "B" on here</p> <p>7 for where your brother is -- was during the storm, or</p> <p>8 if you got two brothers.</p> <p>9 Or do you have two brothers with</p> <p>10 property there that were close by?</p> <p>11 A. Yeah. Let's see.</p> <p>12 Q. Why don't you do a "J" for Judd. And I</p> <p>13 forget who the other one was.</p> <p>14 A. Judd was over to the -- Judd was over</p> <p>15 here in a townhome and then Derrick was over --</p> <p>16 Derrick was over here. My father was right here,</p> <p>17 (indicates).</p> <p>18 Q. So you put a "J" for Judd, a "D" for</p> <p>19 Derrick, and an "F" for father?</p> <p>20 A. Uh-huh.</p> <p>21 Q. Okay. Thank you.</p> <p>22 THE WITNESS: Do you get all these</p> <p>23 back?</p> <p>24 MR. DAIN: She gets them all back. So</p> <p>25 she will take a little inventory at some point as</p>	<p style="text-align: right;">Page 224</p> <p>1 is --</p> <p>2 Q. How about Crate & Barrel at the end, is</p> <p>3 there anything that you bought from Crate & Barrel</p> <p>4 that was replaced?</p> <p>5 A. Yeah, I think I would have to go</p> <p>6 through that list and be more specific, but I don't</p> <p>7 believe that's really that pertinent to it all.</p> <p>8 A few things easy to understand, I</p> <p>9 would just -- we're going to need to re -- get you</p> <p>10 something a little more specific, because I can see</p> <p>11 the -- where we are going with everything. And to</p> <p>12 make it easy on you, I need to talk to my counsel and</p> <p>13 get something to you a little more specific.</p> <p>14 Q. Okay. Thank you. I don't really have</p> <p>15 a desire to cross-examine you on all the particular</p> <p>16 receipts and invoices here to find out what they are.</p> <p>17 I just want to make sure that I'm</p> <p>18 clear that: It is not your position here today that</p> <p>19 all these bills are as a result of flooding?</p> <p>20 A. Right, not directly. What you need is</p> <p>21 a very specific: What part of this is directly</p> <p>22 related to the flood and what directly do you still</p> <p>23 need from me to have done?</p> <p>24 Q. Those things are true.</p> <p>25 A. Okay.</p>
<p style="text-align: right;">Page 223</p> <p>1 well.</p> <p>2 THE WITNESS: Okay. Can I get a copy</p> <p>3 of the little, architectural drawings or is that --</p> <p>4 MR. SALISBURY: I have got one.</p> <p>5 MR. DAIN: He has got a clean copy.</p> <p>6 MR. SALISBURY: You can take mine.</p> <p>7 MR. DAIN: Off the record.</p> <p>8 (Recess taken)</p> <p>9 (Exhibit 17 marked)</p> <p>10 Q. (BY MR. DAIN) So I got 17, which is</p> <p>11 Welling 000401 through Welling 000473. It is a</p> <p>12 collection of receipts and documents that were</p> <p>13 produced in this case. I don't understand why it was</p> <p>14 produced or what is reflected in here.</p> <p>15 Have you seen this document before?</p> <p>16 A. Yeah, Montalbano.</p> <p>17 Q. Say again.</p> <p>18 A. This one, Montalbano Lumber.</p> <p>19 Q. Well, the whole package. There is a</p> <p>20 lot of them that are Montalbano. There is Crate &</p> <p>21 Barrel. There is Javier De la Torre. There is a</p> <p>22 mattress receipt in here.</p> <p>23 A. Yeah, I would say the Montalbano Lumber</p> <p>24 is the one that is primarily for construction. Tree</p> <p>25 service, there is the Fantastic Tree Service. There</p>	<p style="text-align: right;">Page 225</p> <p>1 (Information to be supplied)</p> <p>2 Q. (BY MR. DAIN) One of the things that</p> <p>3 we would like to understand from each of the test</p> <p>4 plaintiffs in this case is what day the waters left</p> <p>5 the test property.</p> <p>6 I asked you a few questions earlier</p> <p>7 about at the time of the August 28 Facebook post, we</p> <p>8 were trying to figure out whether the water at that</p> <p>9 point had left the building or not --</p> <p>10 A. Uh-huh.</p> <p>11 Q. -- and it might have, it was pretty</p> <p>12 close at that point.</p> <p>13 Is that a fair characterization of</p> <p>14 what you said?</p> <p>15 A. From the Facebook, yeah, the water</p> <p>16 left, but not the mud.</p> <p>17 Q. Correct, correct.</p> <p>18 A. I'm just talking liquidity muck.</p> <p>19 Q. I understand a mess remained.</p> <p>20 A. Yeah.</p> <p>21 Q. I understand that.</p> <p>22 How quickly did the water recede from</p> <p>23 August 28th forward?</p> <p>24 A. I would be taking guesses.</p> <p>25 Q. Well, let me put some framing on it.</p>

<p style="text-align: right;">Page 226</p> <p>1 So I don't want pure guesses.</p> <p>2 Within the course of four days, would</p> <p>3 it have left your property?</p> <p>4 A. Since it first got there?</p> <p>5 Q. Yes. Would the flood waters had re --</p> <p>6 in four days after your last Facebook post, would</p> <p>7 the -- would the waters at least by that point have</p> <p>8 been entirely off your property, not counting the</p> <p>9 mess left behind?</p> <p>10 A. Oh, you're talking about the four days</p> <p>11 after I had my last post?</p> <p>12 Q. Yes.</p> <p>13 A. I think that is fair to say they would</p> <p>14 have gotten off my property. Maybe not off</p> <p>15 Brenner's.</p> <p>16 Q. Okay.</p> <p>17 A. It would still be on the parking lot.</p> <p>18 Q. But we are still -- and just so the</p> <p>19 record's clear, you just don't know as you sit here</p> <p>20 today whether it was three days, four days or five</p> <p>21 days, but it was something of that magnitude?</p> <p>22 A. Right. I mean, I have a couple of</p> <p>23 conclusions and theories, but I don't think this is</p> <p>24 the time and place for me to exploit that or talk</p> <p>25 about it, but I will just answer the questions.</p>	<p style="text-align: right;">Page 228</p> <p>1 that were dry or kept dry or to navigate water around</p> <p>2 areas that normally would have marshy, swampy Houston</p> <p>3 places that would not be able to be buildable. Maybe</p> <p>4 you're able to build here but then over here you</p> <p>5 can't.</p> <p>6 I know the demographics of my</p> <p>7 neighborhood and a few feet left, you can build; a</p> <p>8 few feet right, you can't. This allows you to do</p> <p>9 that, allows communities to grow and to prosper.</p> <p>10 Q. Did your brother Derrick's place flood?</p> <p>11 A. Judd's place that Derrick lived in,</p> <p>12 yes.</p> <p>13 Q. So Judd had two places?</p> <p>14 A. Judd has one place. He lives with --</p> <p>15 he allowed my brother to live there and he is staying</p> <p>16 with his girlfriend across the street.</p> <p>17 Q. Okay. So Judd's place where Derrick</p> <p>18 lived, did that flood?</p> <p>19 A. Yes.</p> <p>20 Q. And Judd's place or Judd's girlfriend's</p> <p>21 place where he was living, did that flood?</p> <p>22 A. No.</p> <p>23 Q. And what's that address?</p> <p>24 A. I have no idea.</p> <p>25 Q. Okay. Handing you what's been marked</p>
<p style="text-align: right;">Page 227</p> <p>1 Q. And you talked about this a little</p> <p>2 earlier, but I didn't really ask you, we didn't frame</p> <p>3 with it a question and answer: What was your</p> <p>4 historic understanding of the purposes of the Addicks</p> <p>5 and Barker dams and reservoirs?</p> <p>6 A. Not being an expert, it is my</p> <p>7 understanding that these reservoirs and -- these</p> <p>8 reservoirs and these dams prevent water from coming</p> <p>9 into areas that are developed in an uncontrolled</p> <p>10 manner; that the Army Corps of Engineers is allowed</p> <p>11 to control it; be it, as I had of thought when I was</p> <p>12 hearing the news, an example is this mass flooding,</p> <p>13 you're able -- instead of having the whole thing</p> <p>14 break, you let water out.</p> <p>15 Q. Let me interrupt you just so I frame it</p> <p>16 a little bit better. Because I might not have framed</p> <p>17 it well. I'm more interested in your historical</p> <p>18 understanding than what you learned either during or</p> <p>19 after Harvey.</p> <p>20 A. Yeah.</p> <p>21 Q. Prior to the Harvey event starting and</p> <p>22 historically when you acquired the property, did</p> <p>23 you -- were you aware of the dams?</p> <p>24 A. Yes. Yeah, they were an important part</p> <p>25 of us being able to build and be able to have places</p>	<p style="text-align: right;">Page 229</p> <p>1 Welling's Exhibit Number 5 -- give me a moment and</p> <p>2 let me get my own copy of it.</p> <p>3 This is Plaintiff's Objections and</p> <p>4 Responses to Defendant United States' Amended Second</p> <p>5 Set of Requests for the Production of Documents.</p> <p>6 Do you recall ever seeing this</p> <p>7 document before?</p> <p>8 A. I don't recall. I do not recall.</p> <p>9 This is the same document you handed</p> <p>10 me before?</p> <p>11 Q. It is not. It is a subsequent Request</p> <p>12 for Production of Documents.</p> <p>13 A. Okay.</p> <p>14 Q. And let me get -- on page four, request</p> <p>15 for production number 36, it says, "Text messages</p> <p>16 received or sent by plaintiffs relating to flooding</p> <p>17 on the test properties or flooding on properties</p> <p>18 within the same neighborhood of the test property</p> <p>19 during or after Hurricane Harvey."</p> <p>20 If you go -- there is an objection,</p> <p>21 and then if you go a few pages down to page eight,</p> <p>22 there is a Shawn Welling-specific response.</p> <p>23 A. Uh-huh.</p> <p>24 Q. Did you ever see that response before</p> <p>25 today?</p>

Page 1

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE UPSTREAM ADDICKS

AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIRS Sub-Master Docket No.

17-cv-9001L

Judge Charles F. Lettow

THIS DOCUMENT RELATES TO:
ALL UPSTREAM CASES

ORAL DEPOSITION OF VAL ALDRED

AUGUST 1, 2018

ORAL DEPOSITION OF VAL ALDRED, produced as a witness at the instance of the Defendant and duly sworn, was taken in the above styled and numbered cause on Wednesday, August 1, 2018, from 8:58 a.m. to 3:31 p.m., before Rene White Moarefi, CSR, CRR, RPR in and for the State of Texas, reported by computerized stenotype machine, at the offices of Potts Law Firm, 3737 Buffalo Speedway, Suite 1900, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and any provisions stated on the record herein.

<p style="text-align: right;">Page 58</p> <p>1 A. No.</p> <p>2 Q. Okay. All right. We can set this aside</p> <p>3 for now.</p> <p>4 Okay. I'm going to ask you a few</p> <p>5 questions now about what happened during Harvey.</p> <p>6 And I've got a -- blank calendars somewhere in front</p> <p>7 of you. So feel free to refer to them if you have</p> <p>8 trouble recalling certain dates.</p> <p>9 A. Okay.</p> <p>10 Q. When did you first hear about the</p> <p>11 possibility that a storm like Harvey was coming?</p> <p>12 A. I think probably whenever the -- the TV,</p> <p>13 you know, stations started reporting it. I don't</p> <p>14 know exactly when that was, but sometime a couple of</p> <p>15 days before it hit.</p> <p>16 Q. Okay. At that time -- well, do you --</p> <p>17 can you give an estimate as to what date that was?</p> <p>18 A. You know, as I recall, this was a</p> <p>19 hurricane that kind of went away and came back from</p> <p>20 the dead again and just flared up pretty quickly.</p> <p>21 Probably the 21st or 22nd.</p> <p>22 Q. Okay. Would you have any text or e-mails</p> <p>23 or anything to show when you first knew about when</p> <p>24 the hurricane was coming?</p> <p>25 A. No.</p>	<p style="text-align: right;">Page 60</p> <p>1 neighborhood was -- was about under water and we</p> <p>2 would have been marooned.</p> <p>3 Q. When you say the entryway to your</p> <p>4 neighborhood, was -- was there -- is that a specific</p> <p>5 street?</p> <p>6 A. It's --</p> <p>7 Q. Are you looking at Exhibit 1?</p> <p>8 A. Yeah, I'm looking at Exhibit 1. It's the</p> <p>9 entrance at La Costa and Memorial.</p> <p>10 Q. Okay. How do you know that La Costa and</p> <p>11 Memorial were becoming impassable?</p> <p>12 A. We had gone down there to see it. I</p> <p>13 think my daughter had -- had driven down there and</p> <p>14 seen that it was filling up pretty quick.</p> <p>15 Q. Okay. Was -- when did water first enter</p> <p>16 your home?</p> <p>17 A. I wasn't on the property when that</p> <p>18 happened.</p> <p>19 Q. Okay. So it was after August 29th?</p> <p>20 A. It was after I evacuated.</p> <p>21 Q. Okay. And you evacuated on August 29th?</p> <p>22 A. Yes, sometime -- 4:00 o'clock in the</p> <p>23 afternoon, 5:00 o'clock.</p> <p>24 Q. And water entered your home after you</p> <p>25 evacuated?</p>
<p style="text-align: right;">Page 59</p> <p>1 Q. Okay. When you heard that Harvey was</p> <p>2 coming, did you prepare in any way?</p> <p>3 A. No.</p> <p>4 Q. Okay. Did you bring in sandbags at all?</p> <p>5 A. No.</p> <p>6 Q. Did you move any personal property</p> <p>7 upstairs?</p> <p>8 A. No.</p> <p>9 Q. Did you elevate any of your property or</p> <p>10 move it to higher ground?</p> <p>11 A. No.</p> <p>12 Q. Did you expect any flooding?</p> <p>13 A. No.</p> <p>14 Q. Why not?</p> <p>15 A. It was just a storm like a lot of other</p> <p>16 storms.</p> <p>17 Q. Okay. Did you plan to evacuate at all?</p> <p>18 A. No.</p> <p>19 Q. Did you evacuate at any point?</p> <p>20 A. We did on the 29th.</p> <p>21 Q. Why did you evacuate on the 29th?</p> <p>22 A. Well, the water was getting higher to the</p> <p>23 point where we -- if we were going to get out at</p> <p>24 all, we had to get out probably toward the latter</p> <p>25 part of that afternoon, because the entryway to our</p>	<p style="text-align: right;">Page 61</p> <p>1 A. That's right.</p> <p>2 Q. Do you have an estimate as to when the</p> <p>3 water entered your home?</p> <p>4 A. No.</p> <p>5 Q. Okay. Where'd you go when you were</p> <p>6 evacuated?</p> <p>7 A. To my daughter's house.</p> <p>8 Q. Where does she live?</p> <p>9 A. She lives in Fairfield, which is at 290</p> <p>10 and the Grand Parkway.</p> <p>11 Q. And did she get any flooding?</p> <p>12 A. No.</p> <p>13 Q. Okay. And how long did you stay there</p> <p>14 for?</p> <p>15 A. Well, we -- my wife stayed there until</p> <p>16 probably -- you know, through the better part of</p> <p>17 October or November. I came back to the house a</p> <p>18 couple of weeks later and lived upstairs to, you</p> <p>19 know, manage the repairs and recovery.</p> <p>20 Q. Okay. When you first -- when did you</p> <p>21 first return to your home after Harvey?</p> <p>22 A. So we came back the 31st, I guess. It</p> <p>23 would be a Thursday, the 31st.</p> <p>24 Q. Do you recall what time?</p> <p>25 A. Probably midmorning, maybe 10:00 o'clock.</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 PHILLIP AZAR

9
 JULY 9, 2018
10 -----

11
12 ORAL DEPOSITION OF PHILLIP AZAR, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 9th day of July, 2018, from 9:02 a.m. to
16 5:03 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Kirby
18 Mansion, 2000 Smith Street, Suite 550, Houston, Texas
19 77002, pursuant to the Federal Rules of Civil Procedure
20 and the provisions stated on the record or attached
21 hereto; that the deposition shall be read and signed
22 before any notary public.

1 know. I have no knowledge of it prior to this
2 deposition or prior to Harvey, I guess.

3 Q. Do you understand that water was released from
4 those structures during the Harvey storm?

5 A. I don't have any personal knowledge of it, but
6 it was all over the paper, everything I read. So other
7 than the news and everything, I don't have any personal
8 knowledge of it.

9 Q. But from reading the news, you understand that
10 that occurred?

11 A. Yes, sir. That's what I heard, anyway.

12 Q. Did your home begin -- did your Magnolia Bend
13 home begin to flood prior to when it was publicized that
14 there were releases of water from the dams?

15 A. I have no idea. Unless you give me some kind
16 of dates and times, I don't know. All I know is I don't
17 remember all that time period back then. I'm not trying
18 to evade my answer. I'm just telling you it rose --
19 there was one time we went down there, if I may add,
20 with the abatement people. I had to get my abatement
21 people down there. Because I wanted -- you know, after
22 a week or so, I wanted to get that stuff out of there
23 because mold would start growing. And it was a sunny
24 day and the water rose. We couldn't even get in.

25 I mean, I drove all the way over there, all

1 of us did, and we couldn't get in. I think the
2 insurance girl that was there at the time -- I'll think
3 of the insurance company in a second -- she went in the
4 back door through the hill. She had boots on. But I
5 couldn't get in there. And it was prior to my -- I
6 wasn't walking real good. It was prior to my
7 transplant.

8 Q. Do you think your home at Magnolia Bend began
9 to flood on August 25th?

10 A. The home or the flooding? Because I don't
11 think it flooded until later.

12 Q. Do you think the Magnolia Bend home began to
13 flood on August 26th?

14 A. I don't remember the dates. It may have been.
15 If I could refer to some documents because I know I did
16 some documents with the flood people. And I put down
17 between the 25th and 27th, it started flooding in the
18 area. I think that's what I put down.

19 Q. Okay.

20 A. But the flood that really happened, I believe,
21 was when it covered all of my family's cars that were up
22 at the stop sign. When I say "stop sign," you know,
23 we're at kind of a down area and then up on a hill, it's
24 on Voss. And they were totally covered, all of them.

25 Q. How many cars did your family park at that stop

1 just me, but for her, for everybody. Everybody was
2 pushed around.

3 But, you know, we were getting kind of
4 toward our end of our rope, and she finally got out
5 there. And she said she's leaving unless I sign
6 something. This is what I was telling you, I signed as
7 to form to allow an inspection, I think I wrote there.
8 That's all. That's all I'm saying.

9 Q. Okay. And when you say "she," you mean
10 Ms. Stout?

11 A. Ms. Stout and her family.

12 Q. And finally, Mr. Azar, if you could turn to the
13 very last page of the document, which is Bates-stamped
14 FEMA 069691.

15 A. Yes, sir.

16 Q. Do you recognize what -- what this is?

17 A. Yeah. I filled it out. I remember doing it
18 wrong. I put down, instead of 2015, 1915. I wasn't
19 even around then. He was. Jack was but I wasn't.

20 Q. What -- what is this page, Mr. Azar?

21 A. I'm sorry. It's a flood field survey. I think
22 she wanted me to fill it out right there and then. I
23 mean, she didn't give me much time to do anything. I
24 think she even helped me fill it out. I think that's
25 why it's mistaken. But I put in there when the flood

1 started on 8/25, again, when it -- that tree came down,
2 and 26.

3 "What date, time did floodwaters enter your
4 risk?" And I put down 8/25 and 8/26. It flooded -- I
5 mean, it entered, you know, probably the garage and
6 stuff. But I mean, it didn't fill up the whole first
7 floor until the 28th. I mean, and when I say filled it
8 up, it filled it up. I've had inches, but never a whole
9 floor, never.

10 Q. So Question No. 9 on this flood field survey
11 is: "Approximately how far is this water from the risk
12 of the home?" And it's referring to the previous
13 question where you had said Buffalo Bayou is the nearest
14 body of water to your home. Your answer there was -- it
15 looks like 25 to 50 feet.

16 A. It may be less. It may be more. I don't know
17 that much about foot or yards as far as measurement. I
18 did not measure it. I didn't walk it off. But I do
19 know it's pretty close to the bayou. And it depends.
20 The bank, the high bank is probably -- you know, from
21 the nearest corner, going to the -- from the house to
22 the bank, it's probably 25. Other parts are probably
23 50 feet.

24 It doesn't make any difference. The whole
25 place flooded. There was more water on the nonbayou

1 When I say this, the last page of the document, 9691.

2 Q. So on September 11th, 2017, you filled out this
3 flood field survey, which is Bates-stamped FEMA 069691.
4 And in answering the question about what date and time
5 did the floodwaters enter your risk, you answered
6 August 25th and 26th, 2017.

7 Do you think that your recollection on 9/11
8 when you filled out this form was correct?

9 A. Yeah.

10 MR. ROBERTS: Objection; vague.

11 A. When the water came in, it came in the garage
12 first and then it came into the first floor. But it may
13 have been a week later before it filled up the whole
14 house. We could get in and house on the 25th and 26th.

15 In fact, it's pretty self-explanatory. If
16 you look at the first document, which was signed a day
17 before, we were standing on -- in the property and there
18 was no water at all. But the day before, there was
19 water -- no, I'm sorry. Three days before, there was no
20 water and she came over. And then she said she couldn't
21 get in, so she left after I came over. And it was.
22 She's right. Water came back in. It was gone, and then
23 it came back in.

24 But getting back to your question, on 8/25
25 and 8/26, that's when the water started coming in. And

1 when the water flooded it really bad, up to the -- that
2 line we talked about earlier. It was probably on the
3 28th or 29th. And I know that from looking at other
4 reports in other papers.

5 Q. (BY MR. LEVINE) Which other reports and papers
6 are you referring to?

7 A. Oh, you know, in The Chronicle and stuff,
8 things on TV or YouTube. That's when the releases were
9 done. I believe the release was done either on the 27th
10 or 28th or maybe sooner. I'm not sure. But it was
11 right after, I guess, the releases, according to
12 The Chronicle, that all of Buffalo Bayou including --
13 what do you call it -- the Harris County district
14 criminal courts got flooded too, again.

15 Q. But you're -- you're basing that off what you
16 saw in the news; is that correct?

17 A. That's the only thing I've got to base it off
18 of. I mean, I was absolutely not there. I was -- we
19 were down here. After it got flooded, we came here.

20 Q. And when you say here, you mean Kirby Mansion?

21 A. Kirby Mansion, yes, sir.

22 Q. Okay.

23 A. And that was probably -- if they found my car
24 on the 30th, then we came down -- we got out of there
25 either on the 28th or 29th when the water went sky high

1 real quick. I mean, I went over there. I could not
2 believe it when I got on the -- I could not believe I
3 couldn't even get there.

4 Q. One other question about this particular page,
5 the FEMA 069691. Question No. 13 asked: "Have you,
6 since you owned this property, done any kind of major
7 improvements?"

8 You circled the answer "Yes." And then the
9 following line says: "If yes, explain."

10 And your response was "Just cosmetic."

11 Can you describe for me what the cosmetic
12 major improvements were to the home since you had owned
13 it?

14 A. We replaced windows, huge windows. We painted
15 the place. I'm sure we did other things. I just don't
16 remember offhand. But, you know, cosmetic stuff. You
17 know, paint the inside, paint the outside. I know we
18 painted the outside three or four times. And I know my
19 brother Mike fixed several, if not all, the windows;
20 just about every one that busted, the seals broke. And
21 I forget the name of the company, but they came down and
22 brought us the windows.

23 Q. Is -- is it fair to say --

24 A. Excuse me. We repaired other things, too,
25 after those floods downstairs. We repaired -- I know we

1 repaired the controls one time behind the -- and the hot
2 tub and all of the controls, including the steam room --
3 the hot steam room, the sauna, shower. I mean, that was
4 after they paid us for those floods.

5 Q. Did you ever make any structural improvements
6 to the home?

7 A. No, sir.

8 Q. Okay. Did you ever do any considerable
9 remodeling since when you purchased the home in 1990?

10 A. No, sir. We just cleaned up what was already
11 there. I don't know, structural remodeling, to me, is
12 those windows. That's probably the biggest thing we
13 ever did was those windows. They're huge. Oh, and I'm
14 sorry, and the roof. It was damaged a couple of times.

15 Q. When you say the roof was damaged a couple of
16 times, on what occasions was the roof damaged?

17 A. I don't remember which occasion, but I know
18 that we got hit with some tornados. It's pretty -- it's
19 public record. The tornados touched down, down there.
20 It was in The Chronicle or maybe a paper out that way.
21 My building was in there too. My -- the 3 Magnolia Bend
22 was in there. Yeah, I know they were up there twice on
23 the roof fixing it.

24 Q. Had -- during the time that you owned the home,
25 had you ever replaced the entire roof?

JANA CANAN BEYOGLU
IN RE DOWNSTREAM ADDICKS

September 18, 2018

1

J2416069 eb

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM ADDICKS *
AND BARKER (TEXAS) * SUB-MASTER DOCKET
FLOOD-CONTROL RESERVOIRS * NO. 17-cv-9002L
 *
 *
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THIS DOCUMENT RELATES TO:
ALL TEST PROPERTIES

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DEPOSITION OF JANA CANAN BEYOGLU

Date Edith A. Boggs, CSR

9-18-18 HOUSTON, TEXAS

JANA CANAN BEYOGLU
IN RE DOWNSTREAM ADDICKS

September 18, 2018

2

DEPOSITION OF JANA CANAN BEYOGLU

DEPOSITION AND ANSWERS of JANA CANAN BEYOGLU, taken before Edith A. Boggs, a certified shorthand reporter in Harris County for the State of Texas, taken at the law offices of Neel, Hooper & Banes, PC, 1800 West Loop South, Suite 1750, Houston, Texas, on the 18th day of September, 2018, between the hours of 1:49 p.m. and 5:06 p.m.

JANA CANAN BEYOGLU
IN RE DOWNSTREAM ADDICKS

September 18, 2018

42

1 Q. Okay. So, we talked about tax day. What about
2 Memorial Day flood, are you aware of --

3 A. All I know is the tax day and Memorial Day, I
4 have a friend in Memorial -- I mean, in Meyerland area
5 that they flooded, not in my neighborhood anybody. That
6 I don't recall.

7 Q. So, were you ever concerned that your house
8 would flood?

9 A. Not at all.

10 Q. Were you -- did you ever subscribe to like any
11 flooding alert service in order to know whether there is
12 a flood in your area?

13 A. Would you rephrase? I'm sorry, I was thinking
14 something else while you were -- yeah.

15 Q. If you've subscribe at any point for the 20
16 plus years that you've been here in Houston -- 28 years
17 to a national flood alert -- or actually, local or
18 national flood alert system that lets you know when
19 there might be flooding in your area?

20 A. Even -- no, never in my area. I mean, flood
21 warnings or something that I get from my phone but
22 that's all. There is no -- there is no alert that we
23 have to leave the house. There's no alert of other
24 things. Nothing.

25 Q. How did you get the system in your phone?

JANA CANAN BEYOGLU
IN RE DOWNSTREAM ADDICKS

September 18, 2018

47

1 They knocked the door.

2 So, I let them come in because they said
3 they flooded, so, they want to come in. And they stayed
4 in my house, and then we all were rescued on 27th.

5 Q. So, on the 26th -- so, the street had already
6 flooded and that's the reason why the lady --

7 A. Yes, this street right here was flooded right
8 here. And water wasn't even that much here. It wasn't
9 too high but it was -- they said it was an elderly lady.
10 So, when her car came in -- actually, I would be able to
11 see the car. I mean, it wasn't too high or anything but
12 they said that she panicked or something. So, she drown
13 herself. It was an elderly -- they said 80 something
14 years old. Her son was around and crying. It was a
15 very bad night that night. So, I guess any other person
16 could have been fine coming out from the water but they
17 said that she was probably panicked.

18 Q. Okay.

19 A. So, it wasn't on the street or anything. It
20 was just right here in the corner, right here.

21 Q. The corner of Gessner Road and Warrenton Drive?

22 A. Uh-huh.

23 Q. So, you said that your neighbors spent the
24 night at your place?

25 A. After 3:00 or 4:00 a.m. in the morning, they

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
) Sub-Master Docket No
4 _____) 17-cv-9002L
 THIS DOCUMENT RELATES TO)
5 ALL DOWNSTREAM CASES)

6
7 -----
 ORAL DEPOSITION OF

8
 DANA CUTTS

9
 JUNE 27, 2018
10 -----

11
12 ORAL DEPOSITION OF DANA CUTTS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 27th day of June, 2018, from 9:07 a.m. to
16 2:55 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at the
18 offices of McGehee, Chang, Landgraf, 10370 Richmond
19 Avenue, Suite 1300, Houston, Texas 77042, pursuant to
20 the Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 house. Also the pictures I took just before the flood
2 and during the flood. I did a lot of crying as I did
3 that. I started having sleep disturbances again when I
4 did that and other disturbances to remember the feeling
5 of despair and hopelessness that occurred when we were
6 getting no direction from anyone and not knowing what we
7 were supposed to do.

8 I remember the joy when I realized that we
9 did not flood from Harvey, that the storm had ended and
10 the water was receding. And I felt very happy to see
11 those pictures. And then I looked again at the pictures
12 as the water started coming back up on the 29th of
13 August, as the water started coming back into our yard
14 under clear skies and remembering and thinking back
15 again that what is happening, what could be happening,
16 when we clearly made it through the storm.

17 Going to -- trying to go to bed that night
18 and not being able to sleep. Getting up at 1:30 in the
19 morning on Wednesday, August the 30th. Going out to my
20 front door with a pillowcase, a shovel, and garden soil
21 to sandbag my front door. Watching four young men troll
22 down the middle of Blue Willow in waders up to their
23 chest with canoes and rafts and calling out to them.
24 And one of them coming over to me and telling me it was
25 hopeless to sandbag the front door because the water

1 would come in the weep holes. Remembering that I
2 invited them into the kitchen to have coffee, total
3 stranger. He gave me his contact information for when
4 we would flood and we would need to be rescued. I
5 thanked him because I told him calling 311 would have
6 been counterproductive. They were totally inundated
7 with calls. Went back to bed, didn't sleep. Got up
8 about 3:00 o'clock, 4:00 o'clock in the morning and
9 stepped into water.

10 And all of those horrible images and events
11 came back to my mind. And I was devastated once again
12 that the government had taken our property. But they
13 had taken it. I had no idea why, why this happened at
14 the time; but it happened. And my mantra through this
15 whole event of the whole process was it is what it is.
16 I have to deal with what I'm given. And that's all I
17 did, and that is how I prepared.

18 I also prepared by talking with my husband
19 and my daughter. Talking about the events, they
20 remembered some things that I did not because, quite
21 frankly, it was a blank in many cases. Sometimes you
22 blank out things that don't -- that you just simply
23 cannot remember.

24 So we talked about it. And, yes, things
25 happened. I started an event diary at that time, at the

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE DOWNSTREAM : Sub-Master Docket

3 ADDICKS AND BARKER : No. 17-cv-9002L

(TEXAS) FLOOD-CONTROL :

4 RESERVOIRS : Judge Susan G.

: Braden

5 :

THIS DOCUMENT RELATES :

6 TO: :

ALL TEST PROPERTIES :

7
8 * * *

9 MONDAY, SEPTEMBER 17, 2018

10 * * *

11
12 Oral deposition of INGA GODEJORD taken
13 at the law offices of Neel, Hooper & Banes,
14 P.C. 1800 West Loop South, Suite 1750,
15 Houston, Texas, commencing at 1:01 p.m.
16 before Debbie Leonard, Registered Diplomat
17 Reporter, Certified Realtime Reporter.

18
19
20
21
22
23 * * *

1 Q. And when you were looking at
2 homes in the Houston area, did you have any
3 understanding of potential flood risks in
4 different areas of Houston?

5 A. No, not at all, nothing.

6 Q. And did potential for flooding
7 come up at all with regard to your
8 consideration of the property that you
9 purchased?

10 A. No.

11 Q. Had you looked into whether the
12 property had flooded before, before you made
13 the purchase?

14 A. No. But, actually -- no, not
15 before.

16 Q. And before you made the
17 purchase of the property, had you ever heard
18 of the Addicks Reservoir and the Barker
19 Reservoir?

20 A. (Moving head side to side.)

21 No.

22 Q. Could you say that --

23 A. No.

24 Q. -- for the court reporter?

25 A. No.

1 Q. At the time that you purchased
2 the house, did you know about the park that
3 was there?

4 A. I think I knew.

5 Q. Was that part of your
6 consideration in buying the home?

7 A. I do not recall.

8 Q. So, now, turning to the period
9 during Hurricane Harvey, were you in Houston
10 during Hurricane Harvey?

11 A. No, I wasn't.

12 Q. Where were you?

13 A. I was in Canada.

14 Q. And when did -- when did you
15 hear about Hurricane Harvey while you were in
16 Canada? Or did you hear about Hurricane
17 Harvey while you were in Canada prior to your
18 house flooding?

19 A. I heard about Harvey before I
20 left to Canada because it was announced, I
21 mean, on TV, on radio, yes.

22 Q. When -- how did -- well, when
23 did you hear that there was going to be a
24 possibility that your -- your house itself
25 would flood?

1 A. The possibility? I never heard
2 about the possibility the house would --
3 would flood.

4 Q. Did you -- was there anyone
5 else at your -- staying at your house while
6 you were in Canada?

7 A. My son was there.

8 Q. Did you have any communications
9 with your son about Hurricane Harvey while
10 you were in Canada?

11 A. Yes.

12 Q. What type of communications?
13 And I -- by that I mean, did you talk on the
14 phone? Did you text message, e-mail?

15 A. Phone, e-mail, text, Skype.

16 Q. And did you provide your
17 attorneys with any of the text messages or
18 e-mails, those type of written
19 communications?

20 A. Yes, e-mails. I do not recall
21 that we provided text messages.

22 Q. Do you know if you still have
23 those text messages?

24 A. I'm afraid I'm -- I don't have
25 them. I got a new phone.

1 furniture?

2 A. No.

3 Q. Do you -- did your son
4 communicate with you and tell you when he was
5 leaving the house?

6 A. Yes, he did.

7 Q. And what did he say?

8 A. He said that he's going to
9 leave the house, and it was August 28 when he
10 said that.

11 Q. And could you -- did he explain
12 to you why he was leaving?

13 A. Not really. He just made a
14 decision, and he left.

15 Q. Did he tell you if he saw any
16 water in the house at the time that he left?

17 A. No. He said that we are 3 feet
18 clear. That was his last observation before
19 he left.

20 Q. I'm going to show you some
21 photographs. If you could look at Exhibit
22 Number 2.

23 (Previously marked
24 Exhibit Godejord-2 was referred to the
25 witness.)

1 THE WITNESS: Yeah.

2 BY MS. HELD:

3 Q. Do you recognize these
4 photographs?

5 A. Uh-huh.

6 MR. BANES: Is that a "yes"?

7 THE WITNESS: Yes. Sorry.

8 BY MS. HELD:

9 Q. Do you know who took these
10 photographs?

11 A. Yes, I know.

12 Q. You know --

13 A. My son.

14 Q. -- who took these photographs?

15 A. My son.

16 Q. And how did he provide these
17 photographs to you?

18 A. He Skyped them, via Skype.

19 Q. And when did he take these
20 photographs?

21 A. I would say the first -- first
22 five photographs he took around August 31st.
23 And the last four, September the 4th he got
24 into house, yeah.

25 Q. And during that time, were you

1 Q. And do you recognize these
2 photographs?

3 A. Uh-huh, yeah.

4 Q. Do you know who took those --
5 these photographs?

6 A. Yes.

7 Q. Who took them?

8 A. Our next-door neighbors,
9 Stackhouses.

10 Q. And how did they provide these
11 photographs to you?

12 A. Via e-mail.

13 Q. So do you know the dates of
14 these photographs, when they were taken,
15 approximately?

16 A. Approximately, yes. The first
17 two, probably August 25th, I would say. The
18 next five, August 28th. And the last three,
19 I would guess August 29th.

20 Q. And the last two photographs,
21 are they of your home?

22 A. Uh-huh.

23 MR. BANES: Is that a "yes,"
24 ma'am?

25 THE WITNESS: Yes, ma'am. I'm

IN THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE UPSTREAM ADDICKS §
AND BARKER (TEXAS) §
FLOOD-CONTROL RESERVOIRS § SUB-MASTER DOCKET

§ NO. 17-cv-9002L

____ §

§ Chief Judge Susan G. Braden

THIS DOCUMENT RELATES TO: §

ALL DOWNSTREAM CASES §

____ §

ORAL DEPOSITION

MR. JEREMY E. GOOD

July 19, 2018

ORAL DEPOSITION OF MR. JEREMY E. GOOD, produced
as a witness at the instance of the United States and
duly sworn, was taken in the above-styled and
numbered cause on the 19th day of July, 2018, from

a.m. to 12:23 p.m., before Michelle Hartman, 9:00

Certified Shorthand Reporter in and for the State of
Texas and Registered Professional Reporter, reported
by computerized stenotype machine at the offices of
Raizner Slania, LLP, 2402 Dunlavy Street, Houston,
Texas 77006, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or

attached hereto.

1 to happen. Sunday, the storm came, the water started
2 to rise up in our subdivision making the roads
3 impassable through I think Wednesday of the following
4 week is when we were able to eventually get out of my
5 neighborhood.

6 I would have to go back and check for
7 sure, but that's my basic recollection. The storm --

8 Q. Let me stop you there.

9 A. Yes.

10 Q. Let me just put a couple of dates on
11 this.

12 A. Thank you.

13 Q. August 26th would be a Saturday. Is
14 that --

15 A. I believe so. Can I check a calendar?

16 MR. WICKERT: (Indicates).

17 THE WITNESS: Yes, that's correct.

18 Q. (BY MR. DAIN) Okay. So just to --
19 again, I just wanted to put some dates on it --

20 A. Absolutely.

21 Q. -- so it helps the record.

22 So I think we're into your discussion
23 of August 27th?

24 A. Sure. So Sunday, August 27th, it's
25 still raining but not as significant. It seems that

1 we were watching the waterline at the house hoping
2 that it doesn't come up any further. We had about
3 20 feet or so before it came to the front door, which
4 was significant for our neighborhood.

5 And then at that point, the rain
6 started to slow down. The water did not continue to
7 rise there in our particular neighborhood, and Monday
8 was the first time the sun came out. I remember the
9 day well when the sun came out and that was a good
10 thing for our neighborhood.

11 At that point I was coming out of my
12 tunnel vision of what was going on there. We started
13 to look around and we thought about 760. I wanted to
14 check in on the tenants to make sure that they were
15 doing okay; that the building was doing okay.

16 I had also been watching -- there
17 were -- someone had alerted me to some sensors that
18 were along the Buffalo Bayou that had flood stages
19 and I was watching those to see had the water risen
20 there, and everything at that point was very -- it
21 was looking very good.

22 The other thing we were watching, too,
23 as well is the Brazos River. We had friends that
24 were on the other side of the Brazos and we were
25 concerned with them. Obviously everyone was trying

1 to check in with everybody, all the friends and
2 family and neighbors and everything else; but at that
3 point, I started sending messages out to tenants to
4 see what was going on, if everybody was okay, how the
5 building was doing, is the roof okay, all of these
6 general-type inquiries.

7 Q. Okay. Let me stop you here --

8 A. Yes.

9 Q. -- and let's just talk about the
10 communications you had from the period with anybody
11 over at the Memorial Mews area from the period of
12 August 26th through August 28.

13 A. Yes.

14 Q. Okay. From the period of August 26
15 through August 28, did you have any conversations
16 with any of the tenants from Unit A?

17 A. Yes.

18 Q. Okay. And that was -- was it -- which
19 one -- which of the tenants?

20 A. I would have to go back and check.

21 There was various phone calls and
22 texts that were going on at that point and I think
23 that we submitted the records of exactly when those
24 messages happened, but some phone calls as well,
25 just, "Hey, how are you doing, is everything okay?"

1 And I don't have an exact recollection of when those
2 conversations happened.

3 Q. That's fine. But during this period --
4 so during this period of August 26th through
5 August 28th, did you have any contact with the
6 tenants from Unit B?

7 A. No, I did not.

8 Q. During this period -- do you know why?
9 Were they there?

10 A. They were not there in the unit at that
11 time.

12 Q. Just were they -- but they were the
13 tenants at that point?

14 A. They were the tenants at that point,
15 yes.

16 Q. Do you know where they were?

17 A. I do not.

18 Q. During August 26th through August 28th,
19 did you have any communications with the tenants of
20 Unit C?

21 A. Yes.

22 Q. And who, which of the tenants?

23 A. Both. Both Pedro -- I call him
24 "David." So David and his wife, Maricella, and on
25 the text messages you'll see him reflected as "David"

1 and "David." I have their phone number saved as
2 David's name. So it has Marcella's cell and his cell
3 as well.

4 Q. And during the period of August 26th
5 through August 28th, did you have any communications
6 with the tenant of the unit, D?

7 A. Yes.

8 Q. And which ones?

9 A. Elizabeth.

10 Q. And what was your -- what did they tell
11 you about the condition of the -- of your property up
12 through August 28?

13 A. Up through August 28th, things were
14 okay. There was accessed still. They were able to
15 get in and out. They were all still there, with the
16 exception of Unit B. And so any reports that they
17 had was the building was fine. I was obviously
18 concerned about them but obviously very concerned
19 about the building as well, which we had an
20 investment in. The building was fine, there were no
21 structural problems, and that everything seemed to be
22 okay.

23 Q. And at that -- were you ever -- what
24 was your first understanding of when the waters of
25 the stream that goes through the park overflowed its

1 banks?

2 A. I was aware of the Addicks release
3 sometime on Monday, August 28th. I don't recall
4 exactly when during the day, but that did trigger a
5 memory of mine over an understanding of mine -- a
6 realization, rather, is the best word to use that
7 this was right next to where our property is and that
8 this could possibly cause issues. Not knowing
9 exactly again what was -- what was happening. The
10 extent of the release and all of the other details
11 were all coming at a very slow, slow basis. I just
12 had no understanding exactly what we were getting
13 into.

14 Q. Did you ever have any understanding as
15 to whether the stream in the park overflowed its
16 banks before any releases from the Addicks Dam had
17 begun?

18 A. I have never been aware of any
19 overflowing of those banks.

20 Q. And when was the first time you had a
21 conversation with some -- a conversation or -- well,
22 let me -- let me go with "conversation" since we have
23 some of the texts.

24 A. Yes.

25 Q. What is the first conversation you

1 had -- you can recall having with one of your tenants
2 relating to whether the water was overflowing the
3 banks?

4 A. The conversation that I had -- that I
5 recall knowing that there was an issue with was with
6 Unit C. I believe -- and I would have to go back to
7 see what we submitted, but I believe that when they
8 stated that the water was coming up to the stairs,
9 and they have got two steps into their house, that is
10 the Unit C in the back on the floor, at that point I
11 became concerned about that, knowing what we had
12 heard, reports that the Addicks was still releasing,
13 they were still releasing water.

14 So that was when I first became aware
15 of it, sometime on August of 28th.

16 Q. And was that a telephone conversation?

17 A. I believe that that was a text message.
18 I believe that that was what we had submitted
19 yesterday.

20 (Discussion off record)

21 (Exhibit 6 marked)

22 Q. (BY MR. DAIN) All right. Handing you
23 what's been marked Good Exhibit Number 6.

24 Do you see that?

25 A. Yes.

1 Q. Now, this is an e-mail string --

2 A. Text message.

3 Q. Text message string, thank you --

4 that's the "David and David" on the top of the first
5 page. Do you see that?

6 A. Yes.

7 Q. Can you tell -- this document was one
8 of the documents that was produced yesterday?

9 A. Yes.

10 Q. Can you tell me what this document is?

11 A. This is a text history between myself
12 and the tenants in Unit C, Pedro and Maricella. The
13 reason it says "David and David" up top, again Pedro
14 goes by "David" and I have both he and his wife's
15 number saved under David's contact.

16 So one is Marcella's phone number and
17 one is David's phone number and this is a group text
18 message that I had sent to them. It appears it's
19 7:24 on Monday, August -- 7:24 a.m., Monday,
20 August 28th checking in with them: "How are you guys
21 doing at the place?"

22 Q. And is that the first time you became
23 aware that any water had inundated -- that any water
24 had overflowed the banks of the creek?

25 A. Yes, when one of them replied, "We're

1 wanting to leave but we can't yet. Water is at the
2 top of our last step."

3 Q. And prior to that text, had you heard
4 from any of your tenants about -- about the water
5 level rising on the property?

6 A. To my recollection, no.

7 Q. Other than your tenants, were you in
8 contact with any other people, other Memorial Mews --
9 other owners or anybody else?

10 A. Not at that point, no.

11 Q. And outside that text, do you have any
12 understanding as you sit here today about when the
13 water exceeded the banks at the creek?

14 A. No, I do not.

15 Q. Other than that text, do you have any
16 knowledge as you sit here today or understanding as
17 you sit here today about when the water first made it
18 onto the property at Memorial Mews?

19 A. No, I do not.

20 Q. What is your understanding of the date
21 and time when flood waters first entered the complex?

22 A. My first understanding would have been
23 Monday morning, August 24th -- excuse me, August 28th
24 at 7:24 when they replied back that the water was
25 there up to the last step.

1 I believe David's response there on --
2 still on the first page, "I woke up this morning at
3 2:30 and the water had risen drastically. I luckily
4 moved my cars, but something told me not to leave my
5 family and now I know why, I can't leave my family
6 like this," and he goes on.

7 I think that was a good -- that is
8 indicative of everyone's understanding of -- or, you
9 know, lack of understanding really of what was
10 happening at this point: That the water was coming
11 in and was continuing to rise at such a rapid and
12 high rate.

13 Q. Now, I have received some of the other
14 texts and document production here.

15 To avoid kind of trying to put them
16 all out here, do you recall during the 28th whether
17 you were getting any other communications about the
18 tenants, about their status?

19 A. I believe that I was in touch by
20 e-mail, e-mail with Unit A at that point, and at that
21 point I don't believe -- I may have called Elizabeth.
22 Elizabeth typically would call and we would talk that
23 way. If there was any text message, that would also
24 happen, but it probably would have been a phone call
25 there.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 WAYNE HOLLIS
10 JULY 19, 2018
11 -----

12 ORAL DEPOSITION OF WAYNE HOLLIS, produced as a
13 witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 19th day of July, 2018, from 8:59 a.m. to
16 12:13 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at Clark,
18 Love & Hutson, G.P., 440 Louisiana Street, Suite 1600,
19 Houston, Texas 77002, pursuant to the Federal Rules of
20 Civil Procedure and the provisions stated on the record
21 or attached hereto; that the deposition shall be read
22 and signed before any notary public.
23
24
25

<p style="text-align: right;">Page 30</p> <p>1 A. Yes.</p> <p>2 Q. Okay. Can you describe those to me.</p> <p>3 A. When I bought the house, I went in the backyard</p> <p>4 and swaled out the backyard. And down the east side of</p> <p>5 the house, we have a concrete-lined little drainage</p> <p>6 ditch about 8 to 10 inches deep that brings the water</p> <p>7 out of the backyard down to the street -- the street</p> <p>8 level.</p> <p>9 Q. And why don't you go ahead, and I'll give you a</p> <p>10 smaller blue pen, and just draw roughly on this where</p> <p>11 that drainage swale and ditch is.</p> <p>12 A. Oh, catch basin here. And then it runs down</p> <p>13 the side of the house to the street.</p> <p>14 Q. And is that concrete lined?</p> <p>15 A. Yes.</p> <p>16 Q. And did that -- did that, plus the work you did</p> <p>17 in the back on the French doors you described, does --</p> <p>18 does that solve any drainage problems you have in the</p> <p>19 backyard?</p> <p>20 A. Yes. That stopped the seepage because they had</p> <p>21 an enclosed patio, and they had no gutters, nor this.</p> <p>22 And I put this in, in '84 or '85 and solved my little</p> <p>23 water holding problem.</p> <p>24 Q. That's -- that's outstanding that you're able</p> <p>25 to do that yourself with your background.</p>	<p style="text-align: right;">Page 32</p> <p>1 driveway comes back to the garage in the back?</p> <p>2 A. No. Water runs down the driveway.</p> <p>3 Q. So just gravity?</p> <p>4 A. Yes.</p> <p>5 Q. Do you know what year your house was built?</p> <p>6 A. I think it was built in '68 or '69.</p> <p>7 Q. And in the rear, there is -- on the plat here,</p> <p>8 there is a garage in the back past the carport that your</p> <p>9 driveway goes through. It says "Garage conversion</p> <p>10 unknown."</p> <p>11 So has that space been converted from</p> <p>12 garage to living space?</p> <p>13 A. No. The family we bought it from had -- I</p> <p>14 guess you'd call it the original man cave. It had a</p> <p>15 pool table out there and air-condition. And I have, in</p> <p>16 my rebuild, converted it back to a garage door and a</p> <p>17 personnel door, and it's back to garage. But we never</p> <p>18 used it other than storage, but they had a poolroom out</p> <p>19 there.</p> <p>20 Q. Okay. So that's -- that's the rebuild after --</p> <p>21 after Hurricane Harvey?</p> <p>22 A. Yes.</p> <p>23 Q. And have you had to add any other drainage</p> <p>24 features to your roof to deal with rainwater?</p> <p>25 A. No, nothing other than gutters.</p>
<p style="text-align: right;">Page 31</p> <p>1 A. I had one of my local contractors do it. I</p> <p>2 laid it out.</p> <p>3 Q. Okay. And then do you have any other</p> <p>4 subsurface drainage features on your property?</p> <p>5 A. There's a subsurface drain that goes into the</p> <p>6 storm sewer that was there when I bought it, and it's</p> <p>7 still there.</p> <p>8 Q. And where is that located?</p> <p>9 A. It's in the back, also.</p> <p>10 Q. Okay. And that drains into the storm sewer?</p> <p>11 A. Yes.</p> <p>12 Q. Do you have a sump pump or anything associated</p> <p>13 with that?</p> <p>14 A. No. No pumps; all gravity.</p> <p>15 Q. Can -- can you mark just with a red X kind of</p> <p>16 the approximate location of that -- that drain?</p> <p>17 A. Right here on the patio.</p> <p>18 Q. Okay. And is that effective to drain water off</p> <p>19 from the patio area?</p> <p>20 A. Yes.</p> <p>21 Q. During the time you've owned it, have you ever</p> <p>22 had any water back up from the -- the storm sewers?</p> <p>23 A. No.</p> <p>24 Q. And then do you have any other drainage, any</p> <p>25 ditch or anything on the side of your property where the</p>	<p style="text-align: right;">Page 33</p> <p>1 Q. And where on the house do you have gutters?</p> <p>2 A. Actually, all around the house now. We have</p> <p>3 along the back here, and then they come down. And</p> <p>4 there -- on the two-story, there is a gutter across</p> <p>5 here. And it drains into a downspout that goes into</p> <p>6 this concrete-lined ditch. And there's gutters all the</p> <p>7 way across the porte cochere. We fixed that, and it</p> <p>8 drains down into this. On the west side, it drains into</p> <p>9 the driveway; and on the east side, it hits the drainage</p> <p>10 ditch.</p> <p>11 Q. So that I understand that when I come back and</p> <p>12 look at the paper later, I'm going to give you an orange</p> <p>13 marker now. And if you -- if you could just kind of</p> <p>14 draw where you have that drainage off the roof. And</p> <p>15 then if you want to make it an arrow so we know the</p> <p>16 direction, that will work.</p> <p>17 A. We've got gutters all the way across here that</p> <p>18 comes out. It goes into this ditch in the back. We</p> <p>19 have gutters that go here that go into this driveway.</p> <p>20 We put gutters on the front of this garage that goes out</p> <p>21 here. And then we lined the porte cochere all the way</p> <p>22 down the house up to the -- we've got a</p> <p>23 second-floor-type deal. And then gutters here that all</p> <p>24 dump onto the driveway to go out.</p> <p>25 Q. And then as the water flows down the driveway,</p>

<p style="text-align: right;">Page 34</p> <p>1 do you have sewer drains for that stormwater close to 2 your driveways? 3 A. We -- we have a storm inlet in between the 4 first house and the second house on the corner is where 5 the storm intake is to the storm sewer. And then going 6 to the west, about four houses down, is the inlet there. 7 Q. So when you have heavy rain and water is 8 draining down your -- down your driveway, does it 9 generally go west or does it go east? 10 A. It normally goes east. The majority of the 11 flow goes east. 12 Q. During heavy rains, have you ever seen water 13 kind of pooling up in the street in front of your house? 14 A. Not until they released the dam water. We're 15 at the highest point between the drain to the east and 16 the drain to the west, our house. 17 Q. Okay. All right. So you're -- 18 A. We had no water in the street. 19 Q. So your area of the subdivision that I'm 20 looking back at Exhibit 1 -- 21 A. Yeah. The -- one of the collection basins is 22 right here. 23 Q. Which is marked in orange. 24 A. And the other collection basin is right there. 25 Q. Okay.</p>	<p style="text-align: right;">Page 36</p> <p>1 as the water came up, we tracked the water upstairs and 2 took wet clothes out of the lower levels of the closet 3 and put them in there and ruined all of the carpet in 4 the three rooms -- the bedroom 4, 3, and 2. 5 I had several people come over to help me, 6 and we were wading in the water chest deep trying to 7 salvage whatever we could. 8 Q. All right. And we will walk -- we'll walk 9 through that. And maybe that's the best place to turn 10 at this point and talk about the storm. 11 MS. ENE: Do we have a quick moment to take 12 a 5-, 10-minute break? 13 MS. TARDIFF: Absolutely. Why don't we do 14 that now? We're off the record. 15 (Break taken from 9:46 a.m. to 9:58 a.m.) 16 MS. TARDIFF: We can go back on the record. 17 Q. (BY MS. TARDIFF) All right. I went back and 18 have a couple of other follow-up questions about your 19 home before we start talking about the storm. 20 Have -- since you purchased the home, have 21 you had to make any -- any -- or have you made any big 22 improvements to the home since your original purpose? 23 A. Yes. 24 Q. And what have you done? 25 A. We replaced the roof, and we redid the</p>
<p style="text-align: right;">Page 35</p> <p>1 A. And we're at the peak. And very little run to 2 the west, most to the east. 3 Q. And then is -- in terms of elevation, does your 4 subdivision, does it go down in elevation as you go 5 toward Buffalo Bayou down -- 6 A. Yes. The natural flow of the land is from 7 north to south. 8 Q. And you are on the north side of Buffalo Bayou, 9 correct? 10 A. Correct. 11 Q. And just looking back at the exhibit that has 12 the floor plans from Harris County Appraisal District, 13 if you can just take a quick peek at the second page, 14 which is -- has the floor plan for your second story. 15 The Bates is LUC 2187. 16 Is that a -- appear to be an accurate 17 depiction of the layout of your second floor? 18 A. That's correct. 19 Q. And we're going to go back later and talk about 20 the damage on your first floor from the floodwaters. 21 Any damage to your second floor? 22 A. Yes. 23 Q. And -- and what damage did you have to your 24 second floor? 25 A. When we tried to save whatever we could save,</p>	<p style="text-align: right;">Page 37</p> <p>1 bathroom, master bath. 2 Q. Master bath. Okay. 3 Have you had any -- aside from replacement 4 of the roof, which is certainly a very common fix for a 5 homeowner, have you had any foundation issues with the 6 home during your ownership? 7 A. None whatsoever. 8 Q. And you haven't constructed any -- any new 9 buildings on the property since you purchased it? 10 A. No. 11 Q. And in your neighborhood, Nottingham Forest 12 Section 8, and looking at Exhibit 1, are there any other 13 drainage features in the neighborhood, retention ponds 14 or anything like that, that facilitate the drainage of 15 rainwater off of the neighborhood? 16 A. No. Only the storm sewers. 17 Q. Okay. And -- and when you were in here in the 18 mid '60s working on the construction of the roads, were 19 you also involved in the construction of the drainage 20 features of the roads? 21 A. No. The drainage features were put in when we 22 put the streets in. 23 Q. Okay. So those were there already? 24 A. Yes. 25 Q. And do you have knowledge, though, based on</p>

<p style="text-align: right;">Page 54</p> <p>1 A. We probably worked on it six to eight days 2 throwing stuff out. 3 Q. And was the County removing damaged goods at 4 that time, or did you have to hire somebody to remove? 5 A. I had some friends that came with trucks and 6 grapples and removed our stuff for us prior to waiting 7 on the County. 8 Q. And I'll ask your wife more details about the 9 flood insurance; but before you came back on the 9th, do 10 you know, had you contacted your insurance company? 11 A. Yes. 12 Q. Okay. And did you get assistance promptly in 13 terms of getting help with the salvage operations? 14 A. Yes. They had an adjuster out while we were 15 salvaging. 16 Q. And looking at Exhibit 1, and I'll ask the 17 question generally, but did all of the homes in the 18 Nottingham Forest 8 neighborhood have floodwater, to 19 your knowledge? 20 A. No. 21 Q. No. Okay. Maybe we look at the second page 22 which has -- so to your knowledge, what areas of 23 Nottingham Forest Section 8 -- 24 A. I'm going to say the west section about three, 25 four streets in, and then the southern section, from</p>	<p style="text-align: right;">Page 56</p> <p>1 THE WITNESS: Did have flooding. Where did 2 you see Carolcrest in here? 3 MR. HARTMAN: I think that Carolcrest is 4 right there. 5 THE WITNESS: Okay. Let's get it 6 orientated the way it should be. That will help. 7 A. Well, Bramblewood flooded all the way to the -- 8 Dairy Ashford, though. So roughly that area, which 9 would be the -- the western part of the subdivision -- 10 Q. (BY MS. TARDIFF) Okay. 11 A. -- down. And the bayou comes here and 12 Bramblewood went underwater up to the eaves of their 13 homes, so... 14 Q. And Bramblewood, those are the homes that are 15 adjacent -- 16 A. Yeah, all adjacent to the green space. 17 Q. Okay. And up to the eaves for those. 18 So as you moved away from Buffalo Bayou, 19 were the water levels lower? 20 A. Yeah. 21 Q. All right. Thank you. 22 And actually, just so we're clear on the 23 record, I'm just going to have you mark the -- the area 24 below your red line that flooded just with an F. 25 A. (Witness complies.)</p>
<p style="text-align: right;">Page 55</p> <p>1 Carolcrest, which is a street north of us, flooded on 2 this end. They didn't flood on this end. And then 3 Bramblewood, the corridor along the bayou flooded. And 4 all of these houses here remained dry. 5 Q. So I'm going to have you take the red marker, 6 and we're on the second page of Exhibit 1 -- 7 A. It's not going to be correct. 8 Q. I know this is -- this is an approximate, but 9 just, you know, your -- your understanding or 10 recollection of the area. 11 A. I can't read that. I'm not clear on where 12 Carolcrest is. 13 MR. HARTMAN: Carolcrest is right there 14 (indicating). 15 THE WITNESS: Yeah, that's Carolcrest. 16 Then where is Bayou Knoll? 17 MR. HARTMAN: Bayou Knoll's right there. 18 THE WITNESS: I can't see this. It's too 19 small. 20 MS. TARDIFF: It is small. I apologize. 21 MR. HARTMAN: Sorry, Kris. Do you want him 22 to circle the areas that had flooding or the areas that 23 didn't? 24 MS. TARDIFF: The areas that did have 25 flooding.</p>	<p style="text-align: right;">Page 57</p> <p>1 Q. There we go. The hatch marks, that works well, 2 too. Perfect. So that's marked as hatch marks. Thank 3 you very much. 4 And I know you produced a lot of documents 5 about the losses from the flooding certainly on your 6 first floor. Was -- just generally speaking, was there 7 anything salvageable from your first floor? 8 A. Nothing other than some clothes that we 9 immediately took to the laundry, wet clothes. And they 10 salvaged some and threw away a ton of them. 11 (Exhibit 5 marked.) 12 Q. (BY MS. TARDIFF) All right. I want to have 13 you take a look at a few e-mails just kind of piecing 14 together our timeline here. So what I've marked as 15 Hollis Deposition Exhibit 5 is Bates-stamped Hollis 16 00773. 17 And, Mr. Hollis, do you recognize this 18 printout of an e-mail from you to -- is it Lilla Wright? 19 A. Lilla Wright. 20 Q. Lilla Wright, on Sunday, August 27th, 2017, at 21 7:54 p.m.? 22 A. Yes. 23 Q. So was this after you had returned home from 24 your travels on Sunday? 25 A. Yes.</p>

<p style="text-align: right;">Page 58</p> <p>1 Q. All right. So at that point your home was 2 still dry? 3 A. Correct. 4 Q. And you indicated you weren't leaving. So you 5 stated also here, "Two blocks south on Bramblewood that 6 is next to bayou, about ten homes had 2-foot of water in 7 them this morning." 8 A. Uh-huh. Yeah. 9 Q. And so Bramblewood, what area, looking at 10 Exhibit 1, were these ten homes in? 11 A. Bramblewood winds around here. And it was the 12 homes that are the lowest right before you get to Dairy 13 Ashford there somewhere. I can't see that. 14 Q. So in this stretch -- I know the numbers, if we 15 look down at the end of Bayou Knoll Drive, the number -- 16 these are just lot numbers -- 17 A. Right. 18 Q. -- start at 33 and go up to -- let's see, 50, 19 here at the end where Nottingham Oaks Trail goes 20 through. So -- so what area of the stretch -- 21 A. The flooding was right in there. 22 Q. Okay. So in -- down here, this point is lot 26 23 through, say -- 24 A. I did not go down there. 25 Q. Okay. So had -- how did you hear that those</p>	<p style="text-align: right;">Page 60</p> <p>1 A. No. 2 Q. And why not? 3 A. We -- we were dry. We didn't know what was 4 going to happen. 5 Q. So did you expect if -- if they opened the dam 6 and they were flooding, did you have any expectations to 7 how high the water might get in your neighborhood? 8 A. No. And we had never flooded, so I didn't 9 think we'd flood. 10 (Exhibit 6 marked.) 11 Q. (BY MS. TARDIFF) So, Mr. Hollis, I've given 12 you what we've marked as Hollis Deposition 6. The Bates 13 is Hollis 00581. And I'm looking at the -- the lower 14 e-mail, or the bottom e-mail on this page from you to 15 Lilla Wright. 16 And Ms. Wright is your Allstate insurance 17 agent; is that correct? 18 A. Yes, that's correct. 19 Q. So this e-mail was sent Tuesday, August 29th at 20 10:33 a.m. So that's a few hours before you evacuated; 21 is that right? 22 A. No. 23 Q. Or no, no. This is -- 24 A. We evacuated -- 25 Q. You had already --</p>
<p style="text-align: right;">Page 59</p> <p>1 homes had 2 feet of water in them that morning? 2 A. My neighbor. 3 Q. Do you recall which neighbor told you that? 4 A. The Fillas. 5 THE REPORTER: The what, sir? 6 THE WITNESS: Filla. 7 Q. (BY MS. TARDIFF) And are they neighbors on 8 your street? 9 A. Yes. 10 Q. And had he also told you that the water in 11 those homes had dropped over the course of the day? 12 A. Yes. 13 Q. And how did you hear that they were going to 14 open up Addicks Dam at 2:00 a.m.? 15 A. My wife heard a little blip on the news. 16 Q. And did that concern you at all with respect to 17 your home? 18 A. Yes. 19 Q. And why? 20 A. Pardon me? 21 Q. Why -- why is that? Why did that concern you? 22 A. If they opened them wide open, we were going to 23 get flooded. 24 Q. And did you contemplate leaving your home on 25 Sunday?</p>	<p style="text-align: right;">Page 61</p> <p>1 A. That's the day after we evacuated. 2 Q. Okay. Thank you. 3 So this is on the 29th, and you're 4 reporting to her that you have 10 inches of water in 5 your home at that time; is that correct? 6 A. Correct. 7 Q. And so had you arrived back at the home by -- 8 by 10:30? 9 A. By boat. 10 Q. By boat? 11 A. Yeah. 12 Q. Okay. So you were able to send this to her -- 13 to Lilla Wright while you were still at the house? 14 A. Correct. 15 Q. So I think -- I think you told me previously 16 you thought you arrived at the home around noon. So -- 17 A. Yeah, but it was probably midday. 18 Q. Okay. 19 A. This was 11:30. So... 20 Q. Okay. 21 A. No, 10:30. 22 Q. 10:30 a.m., 10:33 a.m. 23 A. Yeah. 24 Q. But this would be -- be an accurate assessment 25 as to how much water you had in your home?</p>

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
 ORAL DEPOSITION OF

8
 ARNOLD MILTON

9
 JULY 10, 2018
10 -----

11
12 ORAL DEPOSITION OF ARNOLD MILTON, produced as
13 a witness at the instance of the United States, and duly
14 sworn, was taken in the above-styled and numbered cause
15 on the 10th day of July, 2018, from 9:02 a.m. to
16 2:48 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 A. Almost the length of the front yard. If I had
2 to pace it, I'd say, I don't know, maybe 20, 25 feet.

3 Q. 25 feet in length?

4 A. About. About.

5 Q. And approximately, do you know what the
6 difference in height would be from the front door to the
7 crack?

8 A. It's probably another 4 or 5 inches.

9 Q. Do you recall what day it was when the water
10 moved from the crack up to your front doorstep?

11 A. Yeah, it was late on the 27th. Or it may have
12 even been close to midnight or even after. I wasn't
13 looking at the clock. I just know it was late and I was
14 watching it with a flashlight through the front window.

15 Q. From the 25th to the 27th, was there any point
16 at which you and your wife discussed evacuating?

17 A. No, I wish we had of.

18 Q. Was there any point from the 25th to the 27th
19 when you recall seeing discussions of evacuations on
20 television?

21 A. I don't recall discussions of evacuations. In
22 fact, that was one of the salient features, there was no
23 warning given. It was all of a sudden here comes the
24 water. If we had any kind of indication we would have
25 certainly gotten our cars and motorcycles out and told

1 Q. What type of car do you drive?

2 A. Well, my wife had an FJ Cruiser with huge
3 wheels and they would have had no problem whatsoever. I
4 had a little Mazda Miata, which I should never have
5 bought, that we used as a so-called Sunday car to go to
6 the movie and stuff. And the water would have been at
7 the floorboards on that thing.

8 Q. But the FJ Cruiser would have been okay?

9 A. Oh, yeah. Uh-huh.

10 Q. You said you looked at the clock before you
11 went to bed that night; is that correct?

12 A. Yes. It was almost exactly 3:00 o'clock as I
13 remember.

14 Q. And is that 3:00 o'clock on the 28th of
15 August 2017?

16 A. Yes.

17 Q. So sometime that evening before 3:00 a.m. was
18 when you saw the water level move from the crack up to
19 your front doorstep; is that correct?

20 A. Right. Right.

21 MR. HOBBS: Objection; form:

22 Q. (BY MR. LEVINE) What was the closest the water
23 your -- what was the closest the water got to your home
24 prior to when you went to bed that you observed?

25 MR. HOBBS: Objection; form.

1 A. Well, it was above my knees when I went to bed
2 in the house.

3 Q. (BY MR. LEVINE) Okay. Let me -- let me back
4 up and understand.

5 Do you recall at what point on August 27th,
6 2017, water entered your home?

7 A. I was not --

8 MR. HOBBS: Objection; form. Asked and
9 answered.

10 A. I was not looking at the clock. I know it was
11 late. My wife claims it was midnight or after. But I'm
12 not sure how exact she was either. Just we were too
13 busy to worry about the time at that point.

14 Q. (BY MR. LEVINE) Okay. So let me ask it
15 differently. Do you know whether water entered your
16 home on August 27th, 2017, or August 28th, 2017?

17 A. I don't know.

18 Q. A moment ago you said you and your wife were
19 busy. What were y'all busy doing around that time?

20 A. We were taking everything we could up the
21 stairs once the water started coming in the house.

22 Q. When you say "everything," can you describe for
23 me what types of things you were taking upstairs?

24 A. All chairs that we could carry. All lamps.
25 Anything small enough to carry. And we also managed to

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES)

7 -----
8 ORAL DEPOSITION OF
9 VIRGINIA MILTON
10 JULY 10, 2018
11 -----

12 ORAL DEPOSITION OF VIRGINIA MILTON, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 10th day of July, 2018, from 3:14 p.m. to
16 5:00 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at
18 Fleming, Nolen & Jez, 2800 Post Oak Boulevard,
19 Suite 4000, Houston, Texas 77056, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto; that the
22 deposition shall be read and signed before any notary
23 public.
24
25

1 storms, is it's not necessarily fearful knowing that
2 there can be flooding and knowing that there can be
3 disastrous effects. I haven't had one that couldn't be
4 repaired.

5 Q. (BY MR. LEVINE) Do you recall at what point
6 water started coming onto your property from the storm
7 that wasn't, you know, falling from the sky?

8 A. You're speaking of Harvey?

9 Q. Yes, ma'am.

10 A. Yes, I do remember exactly when water started
11 coming into our -- into my home.

12 Q. When did water start coming into your home
13 during Hurricane Harvey?

14 A. After midnight on August 28th.

15 Q. Do you know what time after midnight --

16 A. I do not know exactly.

17 Q. -- on the 28th?

18 I'm sorry. Let me ask it again.

19 Do you know what time on the 28th?

20 A. I do not.

21 Q. Do you know what time water started coming off
22 the street onto your property?

23 MR. HOBBS: Objection; form.

24 A. I wasn't looking out my front door at that time
25 when water started coming into our home. It had been

1 raining for several days and there was a lot of water.
2 But it would be heavy, heavy rain, and then all of a
3 sudden it would stop and it would -- our drains worked
4 perfectly. You know, in the heaviest rain, maybe water
5 would just get up to the curb. Water -- the rain would
6 stop and clear up for a while, it just drained right
7 off.

8 Our backyard was perfect. Nothing -- no
9 water in the yard. You could see definitely there's
10 water on the pea gravel on the patio, but nothing to be
11 alarmed. We were watching television. A movie, not the
12 news, and the electricity went off. And so we were
13 going to bed.

14 And I went down to the kitchen to get a
15 drink of water and my husband was coming down the stairs
16 when I'm stepping down from the breakfast room into the
17 great room and water is coming in and rising. That's
18 when I first saw the water. I never -- I wasn't at the
19 front when the water first started coming in that I saw,
20 I was at the back.

21 Q. (BY MR. LEVINE) Where were you watching the
22 movie?

23 A. Upstairs in our game room.

24 Q. Did the power go off before you came
25 downstairs?

1 Q. And how do you know it was around midnight?

2 MR. HOBBS: Objection; form.

3 Q. (BY MR. LEVINE) Let me ask that again.

4 A. Be --

5 Q. Let me ask it again, please. Thank you.

6 How do you know it was around midnight that
7 water started to come into your home on approximately
8 August 28th?

9 MR. HOBBS: Objection; form.

10 A. It had to be after midnight because, as I said,
11 I was aware of the time, having moved around in my
12 house, and I was watching a movie. And we were watching
13 a movie that was later. So it had to be after midnight
14 because the movie didn't start until something like
15 11:00 or 11:30, so it had to be after midnight. What
16 time exactly, I cannot say.

17 Q. (BY MR. LEVINE) After midnight on August 28th,
18 2017?

19 A. That's what I think, yes. Also, remember, we
20 had to recall these dates when we had to call FEMA
21 immediately. So these dates are pretty well pressed
22 into your mind.

23 Q. After you saw -- after you stepped down and you
24 saw the water coming in, what did you do next?

25 A. I told Arnold, who was coming down from the

1 THE UNITED STATES COURT OF FEDERAL CLAIMS
IN RE: DOWNSTREAM ADDICKS)
2 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS)
4) SUB-MASTER DOCKET NO.
5) 17-CV-90021
6)

7 *****

8 ORAL DEPOSITION OF

9 JENNIFER SHIPOS

10 September 19, 2018

Volume 1

11 *****

12 ORAL AND VIDEOTAPED DEPOSITION OF JENNIFER SHIPOS,
13 produced as a witness at the instance of the DEFENDANT,
14 was taken in the above-styled and numbered cause on
15 September 19, 2018 from 3:02 p.m. to 5:05 p.m., before
16 Toyloria Lanay Hunter, CSR in and for the State of
17 Texas, reported by machine shorthand, at the law offices
18 of NEEL, HOOPER & BANES, P.C., 1800 West Loop South,
19 Suite 1750, Houston, Texas 77027, pursuant to the
20 Federal Rules of Civil Procedure and the provisions
21 stated on the record or attached hereto.

1 Q. Put them upstairs?

2 A. Yeah. I got my passports. I probably did all
3 that on maybe the 28th or 27th. 27th, 28.

4 Q. Any important documents, things like that, you
5 would move upstairs?

6 A. Yes, because before that, the water had been
7 coming up and going back down at my house. So I didn't
8 really -- didn't think about doing it until probably
9 maybe the 20 -- when I heard that there is going to be
10 probably be a release of water.

11 Q. Oh, thank you. Let's back up.

12 So prior to getting notice about the dams
13 releasing water --

14 A. Yes.

15 Q. -- you had actually had water in your yard?

16 A. I had water in my yard, yes. You know, it was
17 getting up to the driveway, but then it would stop
18 raining and then it would recede.

19 Q. When did -- if you received the notice --
20 excuse me. When you received the notice, how long
21 before that had the water been coming into your yard?

22 A. I'm sorry. I don't understand that.

23 Q. Before you received notice --

24 A. Notice of what?

25 Q. Of releasing the dams.

1 A. Okay.

2 Q. That they were going to release the dam --

3 A. Uh-huh.

4 Q. -- how long had the water been coming up in
5 and out of your yard?

6 A. I don't know. Maybe over the course of the
7 day or two days.

8 Q. And where were your cars during this time?

9 A. Well, I was under the impression that it was
10 going to start receding again once the water stopped.
11 So long story short, I did not get my cars out.

12 Q. You kept them in your driveway?

13 A. They were in the garage, yes.

14 Q. They were in the garage.

15 A. And then when we woke up the next morning, it
16 was too late.

17 Q. When -- were you going back and forth to work
18 during this time period?

19 A. Oh, no, no. No school, no work, no nothing.
20 Everything was shut down.

21 Q. How deep was the water in the street, if you
22 recall?

23 A. At what point?

24 Q. During the time period when you said it was
25 falling up and down.

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS
2 IN RE UPSTREAM ADDICKS)
 AND BARKER (TEXAS))
3 FLOOD-CONTROL RESERVOIRS) Sub-Master Docket No
4 _____) 17-cv-9002L
5 THIS DOCUMENT RELATES TO)
6 ALL DOWNSTREAM CASES) August 1, 2018

7 -----
8 ORAL DEPOSITION OF
9 PETER SILVERMAN
10 JULY 18, 2018
11 -----

12 ORAL DEPOSITION OF PETER SILVERMAN, produced
13 as a witness at the instance of the United States, and
14 duly sworn, was taken in the above-styled and numbered
15 cause on the 9th day of July, 2018, from 9:06 a.m. to
16 3:52 p.m., before Morgan Veletzuy, CSR in and for the
17 State of Texas, recorded by machine shorthand, at 1200
18 Smith Street, 12th Floor, Houston, Texas 77002, pursuant
19 to the Federal Rules of Civil Procedure and the
20 provisions stated on the record or attached hereto; that
21 the deposition shall be read and signed before any
22 notary public.
23
24
25

1 A. Yeah. I'd refer to that one because that's how
2 I know what day --

3 Q. Okay. So let's -- let's just mark this then as
4 Exhibit 9 which is the identical picture as Exhibit 5,
5 but it has a time and date stamp on it but no Bates
6 number. But it's identical to Exhibit 5 which I believe
7 is Silverman 000026.

8 (Exhibit 9 marked.)

9 A. So at around this time of day, which is around
10 4:53, sorry, I went and I took four or five pictures
11 including one at the Garcias' house that I was telling
12 you about before, how I walked down their driveway. I
13 took one at my house. I took one at the corner. And I
14 took one of the drain to show my wife that the drain was
15 working properly and that all was good.

16 Q. (BY MS. IZFAR) Okay. So at this point at
17 4:53 p.m. on August 27th, you took this picture. And
18 this picture shows water that is flowing in the streets?

19 A. Not a whole lot, but it shows -- it shows the
20 front of my house.

21 Q. Okay.

22 A. And I don't know if any -- I don't think there
23 are -- you know, very -- very little water, but no
24 freestanding water or anything like that. Just water
25 going by my house. And if we look at that other one

1 more, you can see from the curb there's not much --
2 there's not much high water. But the water was flowing
3 out from Exhibit 6 in the drain.

4 Q. Okay. So from Exhibit 6 you pointed to water
5 flowing out of a drain. Was this also taken at
6 4:53 p.m. on August 27th?

7 A. They were all taken around the same time of
8 day.

9 Q. Okay. Did you take these pictures?

10 A. I did.

11 Q. Okay. And this pipe that is pouring water,
12 where is this located in your home?

13 A. That is located on the --

14 Q. Is it located in the front of your home?

15 A. On the front of my home on the east side of my
16 driveway.

17 Q. Okay. And was the water that was in the street
18 flowing east?

19 A. Yes.

20 Q. Okay. And how much water do you estimate was
21 there on August 27th at around 4:53 p.m.?

22 A. As far as in the street or -- there was --
23 there was no water standing in my yard. There was no
24 water standing in -- anywhere around. There was
25 water -- it would rain on and off. But at this time of

1 day, the sun had come out and just things were pretty
2 normal.

3 Q. So would you estimate -- how much -- can you
4 estimate how much water was actually flowing through?

5 A. I can't. I don't know how to estimate that.

6 Q. Okay. How high do you believe this curb is?

7 A. 4 inches maybe.

8 Q. Okay. And --

9 A. And so there's maybe a quarter inch in the
10 street.

11 Q. A quarter inch of water flowing in the street?

12 A. Yeah, if that. I mean -- and only -- and not
13 covering the street, only at the edge where the water
14 flows at the lowest point where the water flows down to
15 the -- downwards.

16 Q. So -- so the entire --

17 A. I wasn't standing in water when I took that
18 picture. My feet would not have been wet.

19 Q. Where were you when you took the picture?

20 A. Standing in the street.

21 Q. You were standing in the street when you took
22 that picture?

23 A. (Nods head.)

24 Q. Okay. So was the water deeper than nearer to
25 the curb?

1 Q. Oh, I think I believe I recall -- I don't think
2 I have it here, but I think I recall that document.

3 Okay. That's helpful.

4 So -- so you took some pictures on the
5 27th --

6 A. Yes.

7 Q. -- and then you sent them to your wife.

8 A. I don't know if I sent them to my wife. I took
9 them -- I took them for protection.

10 Q. Okay.

11 A. So she wouldn't be mad at me for leaving.

12 Q. Yeah. When did you first hear that there was a
13 possibility of a hurricane?

14 A. Oh, I mean, before that. By this time -- by
15 the 27th, like the hurricane had passed, everything was
16 done. We had -- we had survived. There was no water in
17 the house. There was no tornados had hit our house. I
18 mean, I was feeling pretty good. The electricity went
19 off -- we had had electricity the whole time, and the
20 electricity had gone off that afternoon. I was waiting
21 for them to turn it back on because it was getting warm.
22 There was no TV or internet or anything like that.

23 Q. Okay.

24 A. But when I first heard of the hurricane, I have
25 no idea. But I will say by this time I thought -- I

1 thought, you know, we're pretty much all clear.

2 Q. Did you first hear about it maybe August 25th?

3 A. No. I'm sure I -- I'm sure I heard about it
4 before August 25th.

5 Q. Okay. Were you following the news?

6 A. Closely. I was -- I was not working at the
7 time, and I'm sort of a 24-hour-a-day news person.

8 Q. Okay. Did you prepare in any way?

9 A. No. No.

10 Q. Okay. Did you buy any sandbags?

11 A. No.

12 Q. Okay. Did you move any property to a higher
13 location?

14 A. No.

15 Q. Did you bag anything up?

16 A. No.

17 Q. Did you ever prepare -- did you ever live
18 through any other storms in Houston?

19 A. We lived there Hurricane Ike.

20 Q. And did you do anything to prepare for that
21 hurricane?

22 A. No. But we -- I spent the night -- I have a
23 sister-in-law and brother-in-law and their daughter who
24 live in town, and we all slept in the same -- in their
25 house together just in case something bad happened, we

1 And, in fact, I thought I lived in -- in the safest area
2 of a large city because I lived near Buffalo Bayou. I
3 never thought about flooding like this.

4 Q. (BY MS. IZFAR) When you say "this type of
5 event," did you mean Harvey?

6 MR. HODGE: Objection; form.

7 A. I meant the release of water from the dams, not
8 the rainfall. The rainfall wasn't my concern at all.
9 My house stayed dry during the rainfall associated prior
10 to the flooding that occurred. So, no, I really meant
11 that -- I really meant that I never considered a
12 either -- a deliberate release of water or a
13 catastrophic release of water. Neither of those things
14 ever crossed my mind as causing a flood that would
15 affect my neighborhood.

16 Q. (BY MS. IZFAR) Do you ever recall a storm like
17 Harvey?

18 MR. HODGE: Objection; form.

19 A. Only to the extent that it gets compared to
20 other rainfall events, some of them on those days that
21 we talked about, the flood claims or Allison or other
22 things. You know, one of your questions earlier -- and
23 I remember I didn't really answer it the way I wanted to
24 -- was I reading or listening that they want to move the
25 rain gauge. The official rain gauge from Houston is at

1 address.

2 Q. Okay. And let's go further into the document.
3 For example, when we reviewed this document, they
4 described that your living room and dining room has room
5 tile. Is that accurate?

6 A. No. The living room and dining room are
7 carpeted.

8 Q. It also suggests here that your house flooded
9 on August 27th, 2017, is that accurate?

10 A. No. I was in my house on August 27th, 2017,
11 and there was no flooding at my house.

12 Q. So if we go to page 6 on Exhibit 19 and if we
13 looked at the one, two, third bullet point from the top,
14 if you would read that to yourself, please.

15 A. I've read it to myself.

16 Q. Is that statement, based upon your own personal
17 knowledge and observation, blatantly false?

18 A. It is. I don't know where they got that
19 information from. And it puts in doubt many of these
20 statements, including the first one which says I was not
21 able to return to my home until August 31st. I did not
22 return to my home on August 31st, so I don't know where
23 they got that from. So I don't know where they got
24 their information from for any of these. It was not
25 from me.

1 Q. So Exhibit 9 and Exhibit 5 are the exact same
2 photo; is that accurate?

3 A. They are, yes.

4 Q. And when was Exhibit 5 and Exhibit 9 taken?

5 A. They were taken late in the afternoon on
6 August 27th.

7 Q. Was there any floodwater in your home late in
8 the afternoon on August 27th, 2017?

9 A. No. By that time the hurricane had passed and
10 we were drying -- we were high and dry and the sun was
11 coming out.

12 Q. So the statement contained in Exhibit 19 would
13 be false, that floodwater began to flood the home on
14 August 27th, 2017?

15 MS. IZFAR: Objection; leading.

16 A. I never would have said that.

17 Q. (BY MR. HODGE) Additionally, within Exhibit 19
18 there's a reference that the house has no gutters. Is
19 that an accurate statement?

20 A. I'm not sure where that is, but as pointed out
21 to counsel for the government before, there is gutters
22 on one stretch of the house with a downspout into the
23 courtyard.

24 Q. There is a reference in Exhibit 19 that the
25 yard slopes towards the house. Is that accurate in

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM)
ADDICKS AND BARKER) Sub-Master Docket
(TEXAS) FLOOD-CONTROL) No. 17-cv-9002L
RESERVOIRS)

ORAL DEPOSITION OF
TIMOTHY STAHL
SEPTEMBER 5, 2018

ORAL DEPOSITION of TIMOTHY STAHL, produced as a witness at the instance of the Defendant, and duly sworn, was taken in the above-styled and numbered cause on September 5, 2018, from 10:10 a.m. to 2:52 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of NEEL, HOOPER & BANES, P.C., 1800 West Loop South, Suite 1750, Houston, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

1 I -- I can look at the flood gauges and go, oh, yeah,
2 you know, by morning of the -- early, early, early
3 morning of the 28th, we're talking -- I was still in
4 Alaska and the sun was still up at midnight. But
5 midnight in anchorage was 3:00 a.m. Houston time.
6 There's a time difference. So some time in there, I
7 was pretty sure there was water in my house.

8 Q. All right. But, again, you weren't in touch
9 with any neighbors who --

10 A. Not until the next -- my neighbor at 269
11 called from Mexico asking if his house was on fire in
12 the morning. I said I have no idea, I'm in Denali.
13 I'm up in Alaska. I said, what about the guys in the
14 middle? Oh, they're in Argentina.

15 Q. All right. So no --

16 A. I couldn't tell you a specific time that the
17 water was there. I can tell you when we came back a
18 few days later, the water had receded outside of the
19 structure still just below the structure. It was --
20 it was close.

21 Q. And when you say just below the structure,
22 can you tell me what you mean by that?

23 A. Well, the back of the house is a pier and
24 beam of sorts and then, of course, you have the deck,
25 which is also on a pier, so the water was below that

1 IN THE UNITED STATES COURT OF FEDERAL CLAIMS

2 IN RE: DOWNSTREAM *

ADDICKS AND BARKER *

3 (TEXAS) FLOOD CONTROL *

RESERVOIRS * SUB-MASTER DOCKET NO.

4 * 17-cv-9002L

5 THIS DOCUMENT RELATES TO:*

6 ALL DOWNSTREAM CASES *

7 *****

8 ORAL DEPOSITION OF DUTCH CHRISTOPHER LINDEBURG

9 VOLUME 1

10 SEPTEMBER 26, 2018

11 *****

12 ORAL DEPOSITION of DUTCH CHRISTOPHER LINDEBURG,
13 produced as a witness at the instance of the United
14 States, and duly sworn, was taken in the above-styled
15 and numbered cause on September 26, 2018, from 4:19
16 p.m. to 6:14 p.m., before Carol Jenkins, CSR, RPR,
17 CRR, in and for the State of Texas, reported by
18 machine shorthand, at the Potts Law Firm, 3737 Buffalo
19 Speedway, Suite 1900, Houston, Texas 77098, pursuant
20 to notice and the Federal Rules of Civil Procedure.

21

22

1 meeting today?

2 A. Correct.

3 Q. Yeah. I've seen you twice today and then one
4 other time at Planet Funk with Mr. Welling and his
5 wife, correct?

6 A. Uh-huh.

7 Q. Okay. And do you remember discussing with me
8 at the meeting at Mr. Welling's house your visits to
9 the property during the storm, where we talked about
10 that?

11 A. A little bit. I was doing the same thing I'm
12 doing here, going through this.

13 Q. Asking you to reconstruct the timeline?

14 A. Uh-huh.

15 Q. Is that a yes?

16 A. Yes. Which I didn't do a very good job of at
17 that point.

18 Q. So it was my understanding that you actually
19 entered the property, went into the first floor
20 basement at some point?

21 A. Absolutely.

22 Q. You remember that?

1 A. Uh-huh.

2 Q. Okay. And you actually saw the water in the
3 first floor?

4 A. I took pictures and sent them to Shawn, yeah.

5 Q. Okay. Do you remember how many times you
6 went to the property starting on the 27th until Shawn
7 returned?

8 A. Every day, pretty much, yeah. Yeah, I mean,
9 yeah, it was part of my routine, so...

10 Q. And were some of those visits in the early
11 morning hours when it was still dark?

12 A. Uh-huh. Yeah.

13 Q. Is that a "yes"?

14 A. Yes. Uh-huh, yes.

15 Q. That's just because we've got to make sure
16 she takes your answer down. I'm not trying to be rude
17 at all.

18 So we talked a little bit earlier about
19 on the 27th you went, the water had not, from the
20 outside appearances, gotten into the house yet?

21 A. The water was up to the parking threshold,
22 which I was able to tell. I walked all the way over

1 and I looked at it. I'm sure. Just knowing -- I
2 mean, I know the property.

3 Q. Right.

4 A. Water can be down there. This isn't our
5 first -- we've had rain here before, so...

6 Q. And I believe you then said you returned much
7 later on the 27th. Did I get that right?

8 A. Let me see here. Click out on that. Let me
9 get back in. Uh-huh.

10 Q. Is that a "yes"?

11 A. Yes. I'm sorry. Yes.

12 Q. And did you return again on the 28th?

13 A. Yes.

14 Q. Do you remember what time of day that was,
15 approximately?

16 A. That would be in the morning, I believe.
17 Yeah, in the morning, around 10:30-ish probably.
18 10:30 a.m.

19 Q. 10:30 a.m.?

20 A. Let me double-check.

21 Q. Okay.

22 A. Planet Funk. Yeah.

1 Q. You said yes?

2 A. I'm sorry. Yes.

3 Q. You believe you returned on the 27th?

4 A. I was there on the 27th in the afternoon and
5 I was there on the 28th in the actual daylight morning
6 and then I was there again on the 29th at the wee
7 hours of the morning around 2:00.

8 Q. Okay. What do you recall about the water
9 levels in the house over that period of time? Did
10 they stay the same? Did they get worse? Did they get
11 better?

12 A. The water levels increased from the morning
13 of the 28th to the wee hour morning of the 29th, it
14 came up probably at least a foot and a half.

15 Q. And that was based on -- what did you see?

16 A. Well, it spilled into the stairwell because
17 when the water butts up to the parking area and the
18 shrubs, the next -- if it comes any further in and up,
19 it has a little bit of a step, about a foot step that
20 needs to come up to come into the basement --

21 Q. Okay.

22 A. -- or the first floor as y'all call it I

1 guess.

2 Q. Okay.

3 A. So when I came back early in the morning, it
4 had come into the basement.

5 Q. On which date?

6 A. That would be early, early morning on the
7 29th, the 2:00 a.m.

8 Q. Okay.

9 A. So from when I went there in the morning of
10 the 28th at 10:30 a.m. and then came back at 2:00 a.m.
11 on the 29th, the water had risen at least a foot and a
12 half.

13 Q. All right. And did you store any property in
14 the first floor yourself?

15 A. Yeah.

16 Q. What did you store down there?

17 A. I don't know. What did I have? I had set
18 design stuff that was left over from Death Trap. I
19 had smoke machines, wardrobe, vacuum, shop vac, I
20 don't know, powder gun. Yeah. We had all sorts of
21 old props, too, like from Blimp Trap. Like old timey
22 dial phones like the ringer phones, old typewriter,

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re DOWNSTREAM ADDICKS
AND BARKER (TEXAS) FLOOD-
CONTROL RESERVOIRS

Sub-Master Docket No. 1:17-9002L

THIS DOCUMENT RELATES TO:

ALL DOWNSTREAM CASES

17-1206L

INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Val Anthony Aldred
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):

835 Thornvine Lane, Houston, Texas 77079

3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs:

None.

4. County Property Parcel Identification number¹: 1024670000024

¹ County Property Parcel Identification Numbers are available at [the FBCAD website](#) and [the HCAD website](#).



5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey (i.e. how deep was the water over time, and how much, and what parts, of your property did it cover):

Flooded Tuesday (8/29) afternoon sometime after 5:00 p.m.; the Plaintiff returned home Thursday morning 8/31 and water had mostly receded. Maximum flooding was 12 or more inches.

6. If known, describe the date and extent of previous Property flooding (if any):

2009 – inch of water following a heavy rainstorm

7. As of August 24, 2017, was the Property located in: the 100-year floodplain ☐; the 500-year floodplain ☐; no known floodplain ☒.

8. When was the Property purchased or leased by you, or do you have some other type of property interest?

Purchased - 1997

9. What is the elevation of the Property according to this website²?

80.7 feet

10. Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes or a floodplain certificate)? If so, please provide the source and date of the information used to determine the elevation.

No.

11. Nature of Property interest (check all that apply): residential ☒; commercial ☐; industrial ☐; owner ☒; renter ☐.

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php



12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved):

Improved.

13. Is the Property currently listed on MLS for sale?

No

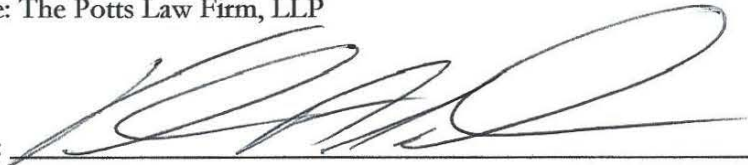
14. Has the Property been sold since Tropical Storm Harvey? No

15. Was there flood insurance for the Property during Tropical Storm Harvey? No

Plaintiff(s) Name: Val Anthony Aldred

Attorney Firm Name: The Potts Law Firm, LLP

Plaintiff(s) Signature: _____



Date: _____

SEPTEMBER 13, 2018

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In Re ADDICKS AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIRS

Master Docket No. 17-3000L

THIS DOCUMENT APPLIES TO:

LS100000345

ALL CASES

INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DON'T KNOW THE ANSWER:

1. Name of Plaintiff(s): Philip Herbert Azar, II
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the USACE's operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):
3 Magnolia Bend Dr., Houston, Texas 77024
3. County Property Parcel Identification number¹: 1149960010003
4. Describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey (i.e. how deep was the water and how much, and what parts, of your property did it cover): August 25, 2017, filled the garage and entire 1st floor, and part of the second floor was also flooded. Plaintiff estimates that water rise to twenty feet on his property and stayed there for ten to fourteen days.

¹ County Property Parcel Identification Numbers are available at [the FBCAD website](#) and [the HCAD website](#).



5. Describe the date and extent of previous Property flooding (if any): Only a couple of inches to maybe 1 foot of water
6. As of August 24, 2017, was the Property located in: the 100-year flood zone ____; the 500-year flood zone X; no known flood zone ____.
7. When was the Property purchased or leased, by you, or do you have some other type of property interest? 1990
8. What is the elevation² of the Property? Unknown
____. What is the source and date of the information you used to determine the elevation? _____
9. Nature of Property interest (check all that apply): residential X; commercial ____; industrial ____; owner X; renter ____.
10. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved): Improved
11. Is the Property currently listed on MLS for sale? NO
12. Has the Property been sold since Tropical Storm Harvey? NO
13. Was there flood insurance for the Property during Tropical Storm Harvey? Yes X No ____
14. Plaintiff(s) Signature Block.

/s/ Philip H. Azar, II
Philip H. Azar, II

01/30/2018

² Elevation information may be available on a flood insurance certification, or is available at https://www.mapdevelopers.com/elevation_calculator.php

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In Re ADDICKS AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIR

Master Docket No. 17-3000L

THIS DOCUMENT APPLIES TO:

ALL CASES

INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Jana and Gokhan Beyoglu
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the USACE's operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):
107 Warrenton Drive, Houston, Texas 77024.
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs: _____

4. County Property Parcel Identification number¹: 0925410000006
5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey: As of August 27, 2017, the Beyoglu's property had some

¹ County Property Parcel Identification Numbers are available at the FBCAD website and the HCAD website.

flooding due to Hurricane Harvey. The Beyoglu's property was inundated, destroyed, substantially damaged, and/or devalued as a direct result of the Government's intentional release of floodwater from the reservoirs into Buffalo Bayou on or about August 27, 2017 to September 2017. Floodwaters occupied the property from on or about August 26²⁷ through September 5, 2017.

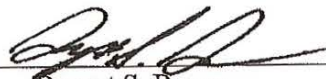
6. If known, describe the date and extent of previous Property flooding (if any): None.
7. As of August 24, 2017, was the Property located in: the 100-year floodplain ; the 500-year floodplain X; no known floodplain .
8. When was the Property purchased or leased by you, or do you have some other type of property interest Property was acquired on or about June 5, 2009, with ownership.
9. What is the elevation of the Property according to this website²? 20.0 meters or 65.5 feet
10. Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes)? If so, please provide the source and date of the information used to determine the elevation. 69 Feet Elevation Certificate from FEMA dated 2/28/2005
11. Nature of Property interest (check all that apply): residential X; commercial ; industrial ; owner X; renter .
12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved): Improvements
13. Is the Property currently listed on MLS for sale? ~~No~~ yes
14. Has the Property been sold since Tropical Storm Harvey? No
15. Was there flood insurance for the Property during Tropical Storm Harvey? Yes X No

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php


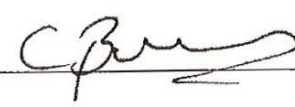
Please contact the undersigned should you have any questions or wish to discuss further.

Very truly yours,

NEEL, HOOPER & BANES, P.C.

By 
Bryant S. Banes

Plaintiff(s) Name: Mahmut Gokhan Beygulu and Jana(Canan) Beygulu

Plaintiff(s) Signature:  

Date: 02 / 06 / 2018

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In Re ADDICKS AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIRS

Master Docket No. 17-3000L

THIS DOCUMENT APPLIES TO:

ALL CASES

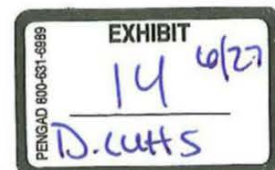
INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DON'T KNOW THE ANSWER:

1. Name of Plaintiff(s): Paul and Dana Cutts
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the USACE's operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):
311 Blue Willow Drive Houston TX 77042
3.

County	Property	Parcel	Identification number ¹ :
<u>Harris</u>	<u>311 Blue Willow Drive</u>	<u>LT 16 BLK 28</u>	<u>0982870000016</u>
	<u>Houston TX 77042</u>	<u>WALNUT Bend Sec 8</u>	
4. Describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey (i.e. how deep was the water and how much, and what parts, of your property did it cover): (Saturday, August 26, 2017 to Tuesday, August 29, 2017: Harvey arrived in Houston, dumping significant rainfall that by Tuesday August 29, 2017 had covered

¹ County Property Parcel Identification Numbers are available at [the FBCAD website](#) and [the HCAD website](#).



portions of our back lawn and front lawn. However, the interior portions of our home and garage did not sustain flooding during this time period. Monday, August 28, 2017: It was announced that Hurricane Harvey had finally changed course and was heading away from Houston. We breathed a sigh of relief upon realizing our property had survived this epic storm without flooding (in fact, our property has never once flooded prior to the post-Harvey dam release event). However, when the decision was made *that same day* to open Addicks Dam and release excess floodwaters, the released dam waters began to quickly flood back into our subdivision. Wednesday, August 30, 2017: By 3:00 a.m., the released dam waters had flowed into our home, and a thin layer of water covered our interior floors on the south side of our house. By 6:00 a.m. on that same morning, the released dam waters had flowed into and impacted all parts of our home. By 7:00 a.m. on that same morning, we were evacuated by kayak in the wake of still-rising dam release waters. We were told we could not return again until the dam release waters had subsided. Thursday, September 7, 2018: A full *eight days later*, we were finally able to access our subdivision and enter our home again (by wading in on foot from several blocks south). On that day, we measured the water marks on the interior walls of our house and found visible water marks up to 8 inches in places throughout. Our entire property had visibly flooded, both inside and outside. The dam release waters reached 12 inches on the back lawn (as indicated by water marks measured at the rear exterior wall of the garage) and 10 inches inside the garage (as indicated by water marks on both cars). The dam release waters completely covered the front lawn. All foliage, including significant plants and trees on both the front lawn and the back lawn, were damaged or killed by exposure to the standing dam release waters. The grass on both the back lawn

- and the front lawn rotted underneath the standing dam release waters and now needs to be completely re-sodded. The sprinkler system was damaged and needs extensive repairs. The garage needs to be completely stripped and repainted. Property stored in the garage was significantly displaced, indicating a current was present as the dam release waters flowed into and through the garage.
5. Describe the date and extent of previous Property flooding (if any): Our property has never once flooded in the past 41 years we have lived there – until the post-Harvey dam release. However, we have kept an active flood insurance policy throughout.
6. As of August 24, 2017, was the Property located in: the 100-year flood zone ____; the 500-year flood zone ____; no known flood zone Zone X.
7. When was the Property purchased or leased, by you, or do you have some other type of property interest? We own the property outright and have lived in it since 1976.
8. What is the elevation² of the Property? 72.4 ft. _____. What is the source and date of the information you used to determine the elevation?
https://www.mapdevelopers.com/elevation_calculator.php January 19, 2018
9. Nature of Property interest (check all that apply): residential __X__; commercial ____; industrial ____; owner __X__; renter ____.
10. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved)
Property had been extensively renovated in 2007 throughout the entire house and we have lived continuously in the house since 1976.
11. Is the Property currently listed on MLS for sale? No
12. Has the Property been sold since Tropical Storm Harvey? No

² Elevation information may be available on a flood insurance certification, or is available at https://www.mapdevelopers.com/elevation_calculator.php

13. Was there flood insurance for the Property during Tropical Storm Harvey? Yes X No

14. Plaintiff(s) Signature Block.

Dana J. Cutts
D. Cutts

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In Re ADDICKS AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIR

Master Docket No. 17-3000L

THIS DOCUMENT APPLIES TO:

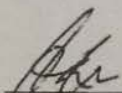
ALL CASES

INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Arnstein and Inga Strause Godejord
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the USACE's operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):
14334 Heatherfield Drive, Houston, Texas 77079.
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs: _____

4. County Property Parcel Identification number¹: 0973400000016
5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey: As of August 27, 2017, the Godejord's property had not

 ISG

¹ County Property Parcel Identification Numbers are available at the FBCAD website and the HCAD website.

flooded due to Hurricane Harvey. The Godejord's property was inundated, destroyed, substantially damaged, and/or devalued as a direct result of the Government's intentional release of floodwater from the reservoirs into Buffalo Bayou on or about August 27, 2017 to September 2017. Floodwaters occupied the house from August 29, 2017 to September 8, 2017.

6. If known, describe the date and extent of previous Property flooding (if any): None.
7. As of August 24, 2017, was the Property located in: the 100-year floodplain ____; the 500-year floodplain X; no known floodplain _____.
8. When was the Property purchased or leased by you, or do you have some other type of property interest Property was acquired on or about 2008, with ownership.
9. What is the elevation of the Property according to this website²? 22.5 meters or 73.8 feet
10. Do you have additional information regarding the elevation of the Property (*e.g.*, measurements taken for insurance purposes)? If so, please provide the source and date of the information used to determine the elevation. _____
11. Nature of Property interest (check all that apply): residential X; commercial ____;
industrial ____; owner X; renter ____.
12. Condition of Property at time of acquisition (*i.e.* vacant, improved, partially improved):
Improved
13. Is the Property currently listed on MLS for sale? No
14. Has the Property been sold since Tropical Storm Harvey? No
15. Was there flood insurance for the Property during Tropical Storm Harvey? Yes ___ No X

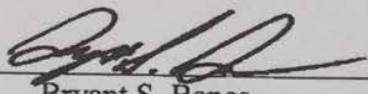
186

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php

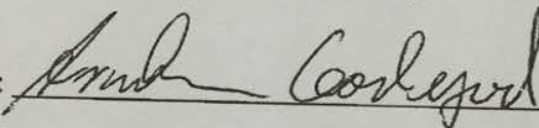
Please contact the undersigned should you have any questions or wish to discuss further.

Very truly yours,

NEEL, HOOPER & BANES, P.C.

By 
Bryant S. Banes

Plaintiff(s) Name: Arnstein Godejord INGA STRAUSE-GODEJORD

Plaintiff(s) Signature:  Arnstein Godejord

Date: February 2, 2018 FEBRUARY 8, 2018

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re DOWNSTREAM ADDICKS
AND BARKER (TEXAS) FLOOD-
CONTROL RESERVOIRS

Sub-Master Docket No. 1:17-9002L

THIS DOCUMENT RELATES TO:

ALL DOWNSTREAM CASES

17-cv-01457

AMENDED INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Good Resources LLC
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):

760 Memorial Mews Street, Houston, TX 77079
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs:

None
4. County Property Parcel Identification number¹: 11472800200004

EXHIBIT

Good
2

Michelle Hartman, CSR

¹ County Property Parcel Identification Numbers are available at [the FBCAD website](#) and [the HCAD website](#).

5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey (i.e. how deep was the water over time, and how much, and what parts, of your property did it cover):

The property consists of four units. On August 28, 2017, water flooded the properties and the street damaging all 4 Air Conditioning Compressors and shared water heater. The flooding reached an estimated 44.5 inches outside, and 38 inches inside the two ground units. The property was inaccessible until September 10, 2017.

6. If known, describe the date and extent of previous Property flooding (if any):

None

7. As of August 24, 2017, was the Property located in: the 100-year floodplain ☐; the 500-year floodplain ☒; no known floodplain ☐.

8. When was the Property purchased or leased by you, or do you have some other type of property interest?

January 30, 2015

9. What is the elevation of the Property according to this website²?

78.4 ft

10. Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes or a floodplain certificate)? If so, please provide the source and date of the information used to determine the elevation.

Yes. 78.5 ft, per elevation certificate prepared by South Texas Surveying Association, Inc.

11. Nature of Property interest (check all that apply): residential ☒; commercial ☐; industrial ☐; owner ☒; renter ☐.

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php

12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved):
Recently updated flooring, cabinets, A/C and appliances.
13. Is the Property currently listed on MLS for sale?
No
14. Has the Property been sold since Tropical Storm Harvey? No
15. Was there flood insurance for the Property during Tropical Storm Harvey? No

Plaintiff(s) Name: Good Resources LLC

Attorney Firm Name: Raizner Slania LLP

Plaintiff(s) Signature:  364CA6A8AB814F9...

Date: 2/13/2018

Plaintiff(s) Signature:  5B78A3D9268F47E...

Date: 2/13/2018

Good Resources LLC

By: Jeremy Good & Ana Good as Managing Members

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re DOWNSTREAM ADDICKS AND
BARKER (TEXAS) FLOOD-CONTROL
RESERVOIRS

Sub-Master Docket
No. 17-9002L

THIS DOCUMENT APPLIES TO:

WAYNE HOLLIS, JR. AND PEGGY HOLLIS
V. THE UNITED STATES OF AMERICA,
No. 1:17-CV-1300L

PLAINTIFFS' FIRST AMENDED INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Wayne Hollis, Jr. and Peggy Hollis.
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"): 14914 River Forest Drive, Houston, Texas 77079-6327.
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs: All personal property was discarded and moved to curbside where the City of Houston hauled the damaged items to an unknown landfill.
4. County Property Parcel Identification number¹: HCAD Parcel ID No. 1000810000012.
5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey (i.e. how deep was the water over time, and how much, and what parts, of your property did it cover): Plaintiffs' residence began flooding on August 28,

¹ County Property Parcel Identification Numbers are available at the FBCAD website and the HCAD website.

2017 due to the United States Corp of Engineers releasing water from the Addicks and Barker Reservoirs. Plaintiffs' residence continued to flood for approximately two weeks following the releases, which reached a high-water mark of approximately 42 inches in the interior of Plaintiffs' residence at the property at issue.

6. If known, describe the date and extent of previous Property flooding (if any): None.
7. As of August 24, 2017, was the Property located in: the 100-year floodplain No; the 500-year floodplain Yes; no known floodplain.
8. When was the Property purchased or leased by you, or do you have some other type of property interest? December 1983.
9. What is the elevation of the Property according to this website²? 23.3 meter or 76.4 feet.
10. Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes or a floodplain certificate)? If so, please provide the source and date of the information used to determine the elevation. According to Google Earth, the property has an elevation of 76 feet as of 01.11.18.
11. Nature of Property interest (check all that apply): residential X; commercial ____; industrial ____; owner ____; renter ____.
12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved): Improved.
13. Is the Property currently listed on MLS for sale? No.
14. Has the Property been sold since Tropical Storm Harvey? No.
15. Was there flood insurance for the Property during Tropical Storm Harvey? Yes X No ____

Plaintiff(s) Name: Wayne Hollis, Jr. and Peggy Hollis

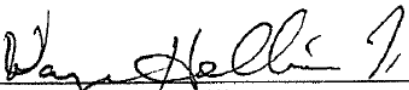
² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php.

Attorney Firm Name: David C. Frederick, D.C. # 431864
dfrederick@kellogghansen.com
**KELLOGG, HANSEN, TODD,
FIGEL & FREDERICK, P.L.L.C.**
1615 M Street, N.W., Suite 400
Washington, D.C. 20036
Telephone: (202) 326-7900
Facsimile: (202) 326-7999

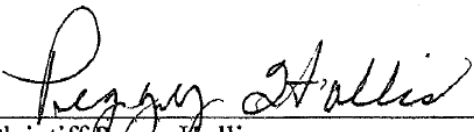
**LEAD COUNSEL FOR
WAYNE HOLLIS, JR. AND PEGGY HOLLIS**

and
Clayton A. Clark
Texas Bar No. 04275750
cclark@triallawfirm.com
Scott A. Love
Texas Bar No. 24002495
slope@triallawfirm.com
CLARK, LOVE & HUTSON, G.P.
440 Louisiana St., Ste. 1600
Houston, Texas 77002
Telephone: (713) 757-1400
Facsimile: (713) 759-1217

“The undersigned plaintiffs, Wayne Hollis, Jr. and Peggy Hollis attest to reviewing the Plaintiffs’ fact sheet in this case and hereby declare the above information, facts and statements contained herein are true and accurate to the best of our knowledge, information and belief.”



Plaintiff Wayne Hollis



Plaintiff Peggy Hollis

Date: 2-14-18

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re DOWNSTREAM ADDICKS)
 AND BARKER (TEXAS) FLOOD-)
 CONTROL RESERVOIRS)
)
) Sub-Master Docket No. 1:17-9002L
)
 THIS DOCUMENT RELATES TO:)
Memorial SMC Investment 2013, LP)
v. United States, No. 17-1451 L)
)

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Memorial SMC Investment 2013, LP
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"): 777 S. Mayde Creek Dr., Houston, Texas
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs: 777 S. Mayde Creek Dr., Houston, Texas
4. County Property Parcel Identification number¹: 1329650010002
5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey (i.e. how deep was the water over time, and how much, and what parts, of your property did it cover): The structures on the Property began to flood at approximately 11:20pm on August 27, 2017, and the Property was flooded through September 11, 2017. The high-water mark on the Property was approximately six feet, measured at an interior location at one of the higher points on the Property. Floodwaters covered the entire Property.
6. If known, describe the date and extent of previous Property flooding (if any): None
7. As of August 24, 2017, was the Property located in: the 100-year floodplain _____; the 500-year floodplain X____; no known floodplain _____.
8. When was the Property purchased or leased by you, or do you have some other type of property interest: It was purchased on June 28, 2013.

¹ 1 County Property Parcel Identification Numbers are available at the FBCAD website and the HCAD website.

9. What is the elevation of the Property according to this website?² 76.3 feet
10. Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes or a floodplain certificate)? If so, please provide the source and date of the information used to determine the elevation. Please see the attached Elevation Certificates for each building on the Property.
11. Nature of Property interest (check all that apply): residential ____; commercial X____; industrial ____; owner X____; renter____.
12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved): Vacant _____
13. Is the Property currently listed on MLS for sale? No _____
14. Has the Property been sold since Tropical Storm Harvey? The property was conveyed to an entity (majority owned by an affiliate of the mortgagee) in order to restructure the debt on the property _____
15. Was there flood insurance for the Property during Tropical Storm Harvey? Yes __ No X

Plaintiff(s) Name: Memorial SMC Investment 2013, LP

Plaintiff(s) Signature: 

Date: February 26, 2018

Respectfully submitted,

/s/ Don C. Griffin

Don C. Griffin, *Attorney of Record*

Texas Bar No. 08456975

D. Ferguson McNiel, *of counsel*

Texas Bar No. 13830300

Deborah C. Milner, *of counsel*

Texas Bar No. 24065761

VINSON & ELKINS LLP

1001 Fannin Street, Suite 2500

Houston, Texas 77002

Telephone: 713 758 3508

Facsimile: 713 615 5985

² Elevation information is available at <https://www.mapdevelopers.com/elevationcalculator.php>

Email: dgriffin@velaw.com
pdye@velaw.com
fmcniel@velaw.com
cmilner@velaw.com

/s/ Richard Warren Mithoff
Richard Warren Mithoff, *of counsel*
Texas Bar No. 14228500
Warner V. Hocker, *of counsel*
Texas Bar No. 24074422
MITHOFF LAW
500 Dallas Street, Suite 3450
Houston, Texas 77002
Telephone: 713 654 1122
Facsimile: 713 739 8085
Email: rmithoff@mithofflaw.com
whocker@mithofflaw.com

**ATTORNEYS FOR PLAINTIFF
MEMORIAL SMC INVESTMENT 2013 LP,
A TEXAS LIMITED PARTNERSHIP**

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Parking Garage		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Non-Residential (Parking Garage)</u>		
A5. Latitude/Longitude: Lat. <u>29°46'37.8"</u> Long. <u>95°37'30.6"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		A9. For a building with an attached garage:
a) Square footage of crawlspace or enclosure(s) <u>N/A</u> sq ft		a) Square footage of attached garage <u>N/A</u> sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <u>N/A</u>		b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade <u>N/A</u>
c) Total net area of flood openings in A8.b <u>N/A</u> sq in		c) Total net area of flood openings in A9.b <u>N/A</u> sq in
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88,2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88,2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

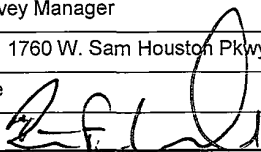
Check the measurement used.

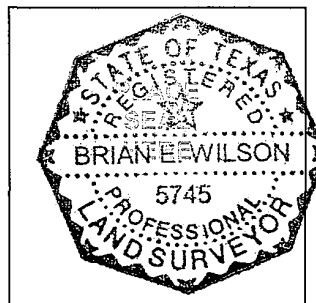
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.0</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.8</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>77.0</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>76.8</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>76.9</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>NA</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a
☐ Check here if attachments. licensed land surveyor? ☐ Yes ☒ No

Certifier's Name Brian E. Wilson		License Number 5745	
Title Survey Manager	Company Name Miller Survey Group		
Address 1760 W. Sam Houston Pkwy N.	City Houston	State Tx	ZIP Code 77043
Signature 	Date 04/15/16	Telephone (713) 413-1900	



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Parking Garage			Policy Number:
City Houston	State Tx	ZIP Code 77079	Company NAIC Number:

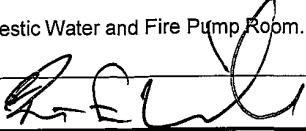
SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

C2(e)- Domestic Water and Fire Pump Room.

Signature



Date 04/15/16

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address

City

State

ZIP Code

Signature

Date

Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

- G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____
- G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____
- G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name

Title

Community Name

Telephone

Signature

Date

Comments

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Parking Garage

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Rear View taken 9/16/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Parking Garage

City Houston

State Tx

ZIP Code 77079

FOR INSURANCE COMPANY USE

Policy Number:

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View taken 9/16/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE**Important: Read the instructions on pages 1-9.**

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 1		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartments</u>		
A5. Latitude/Longitude: Lat. <u>29°46'37.8"</u> Long. <u>95°37'30.6"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		A9. For a building with an attached garage:
a) Square footage of crawlspace or enclosure(s) <u>N/A</u> sq ft		a) Square footage of attached garage <u>5,280</u> sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <u>N/A</u>		b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade <u>N/A</u>
c) Total net area of flood openings in A8.b <u>N/A</u> sq in		c) Total net area of flood openings in A9.b <u>N/A</u> sq in
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88,2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88,2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

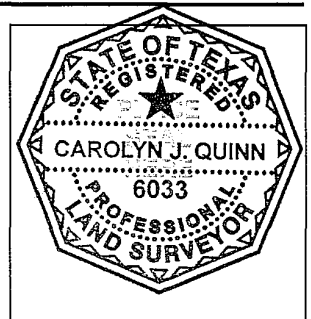
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.87</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.42</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>77.40</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>76.61</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>76.7</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>77.2</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>77.22</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.

Certifier's Name Carolyn J. Quinn License Number 6033
Title R.P.L.S. Company Name Miller Survey Group
Address 1760 W. Sam Houston Pkwy N. City Houston State Tx ZIP Code 77043
Signature Carolyn J. Quinn Date 8/19/15 Telephone (713) 413-1900



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 1			Policy Number:
City Houston	State Tx	ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCB Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

C2(e) - A/C Pad.

Signature

Date 8/19/15

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address

City

State

ZIP Code

Signature

Date

Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

G7. This permit has been issued for: ☐ New Construction ☐ Substantial ImprovementG8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name

Title

Community Name

Telephone

Signature

Date

Comments

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 1

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 8/14/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 1

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 8/14/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

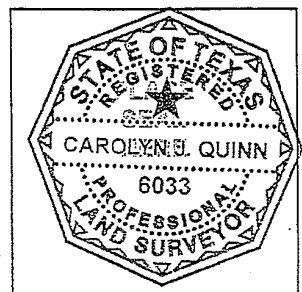
OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A – PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 2		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartments</u>		
A5. Latitude/Longitude: Lat. 29°46'37.8" Long. 95°37'30.6" Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		
a) Square footage of crawlspace or enclosure(s)	<u>N/A</u>	sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A8.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
A9. For a building with an attached garage:		
a) Square footage of attached garage	<u>1,920</u>	sq ft
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A9.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

SECTION B – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION					
B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88,2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C – BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)	
C1. Building elevations are based on: <input type="checkbox"/> Construction Drawings* <input type="checkbox"/> Building Under Construction* <input checked="" type="checkbox"/> Finished Construction *A new Elevation Certificate will be required when construction of the building is complete.	
C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters. Benchmark Utilized: <u>RM 210395</u> Vertical Datum: <u>NAVD 88 (2001 ADJ)</u> Indicate elevation datum used for the elevations in items a) through h) below. <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88,2001 ADJ</u> Datum used for building elevations must be the same as that used for the BFE.	
Check the measurement used.	
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.72</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.42</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>77.34</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>77.22</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>77.1</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>77.2</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>77.10</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION	
This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.	
<input checked="" type="checkbox"/> Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<input type="checkbox"/> Check here if attachments.	
Certifier's Name Carolyn J. Quinn	License Number 6033
Title R.P.L.S.	Company Name Miller Survey Group
Address 1760 W. Sam Houston Pkwy N.	City Houston State Tx ZIP Code 77043
Signature <i>Carolyn J. Quinn</i>	Date 10/13/15 Telephone (713) 413-1900



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 2		Policy Number:
City Houston	State Tx ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

C2(e)- A/C Pad.

Signature

Lawolym

Date 10/13/15

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address

City

State

ZIP Code

Signature

Date

Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

- G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____
- G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____
- G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name	Title
Community Name	Telephone
Signature	Date
Comments	

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 2

Policy Number:

City Houston

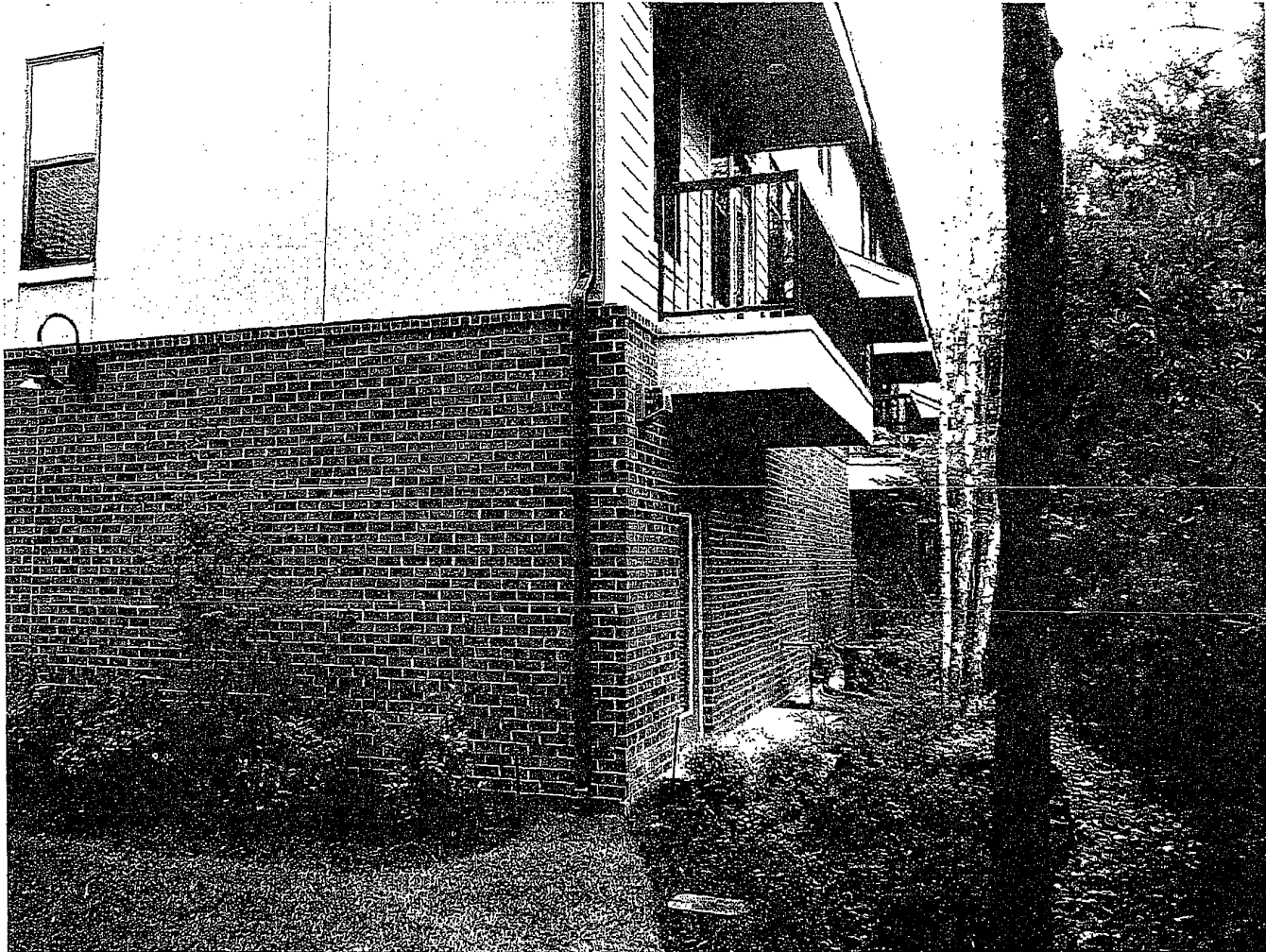
State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 9/01/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 2

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 9/01/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 3		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartment</u>		
A5. Latitude/Longitude: Lat. <u>29°46'37.8"</u> Long. <u>95°37'30.6"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		
a) Square footage of crawlspace or enclosure(s)	<u>N/A</u>	sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A8.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
A9. For a building with an attached garage:		
a) Square footage of attached garage	<u>2,880</u>	sq ft
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A9.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88,2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88,2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

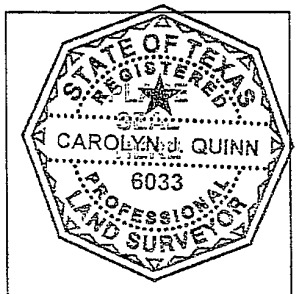
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.60</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.21</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>77.22</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>77.24</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>77.1</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>77.3</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>77.05</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.

Certifier's Name Carolyn J. Quinn License Number 6033
Title R.P.L.S. Company Name Miller Survey Group
Address 1760 W. Sam Houston Pkwy N. City Houston State Tx ZIP Code 77043
Signature Carolyn J. Quinn Date 10/13/15 Telephone (713) 413-1900



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 3		Policy Number:
City Houston	State Tx ZIP Code 77079	Company NAIC Number:

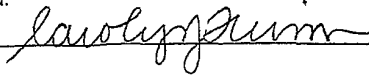
SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

c2(e) - A/C pad.

Signature



Date 10/13/15

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address City State ZIP Code

Signature Date Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

- G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____
- G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____
- G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name Title

Community Name Telephone

Signature Date

Comments

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 3

Policy Number:

City Houston

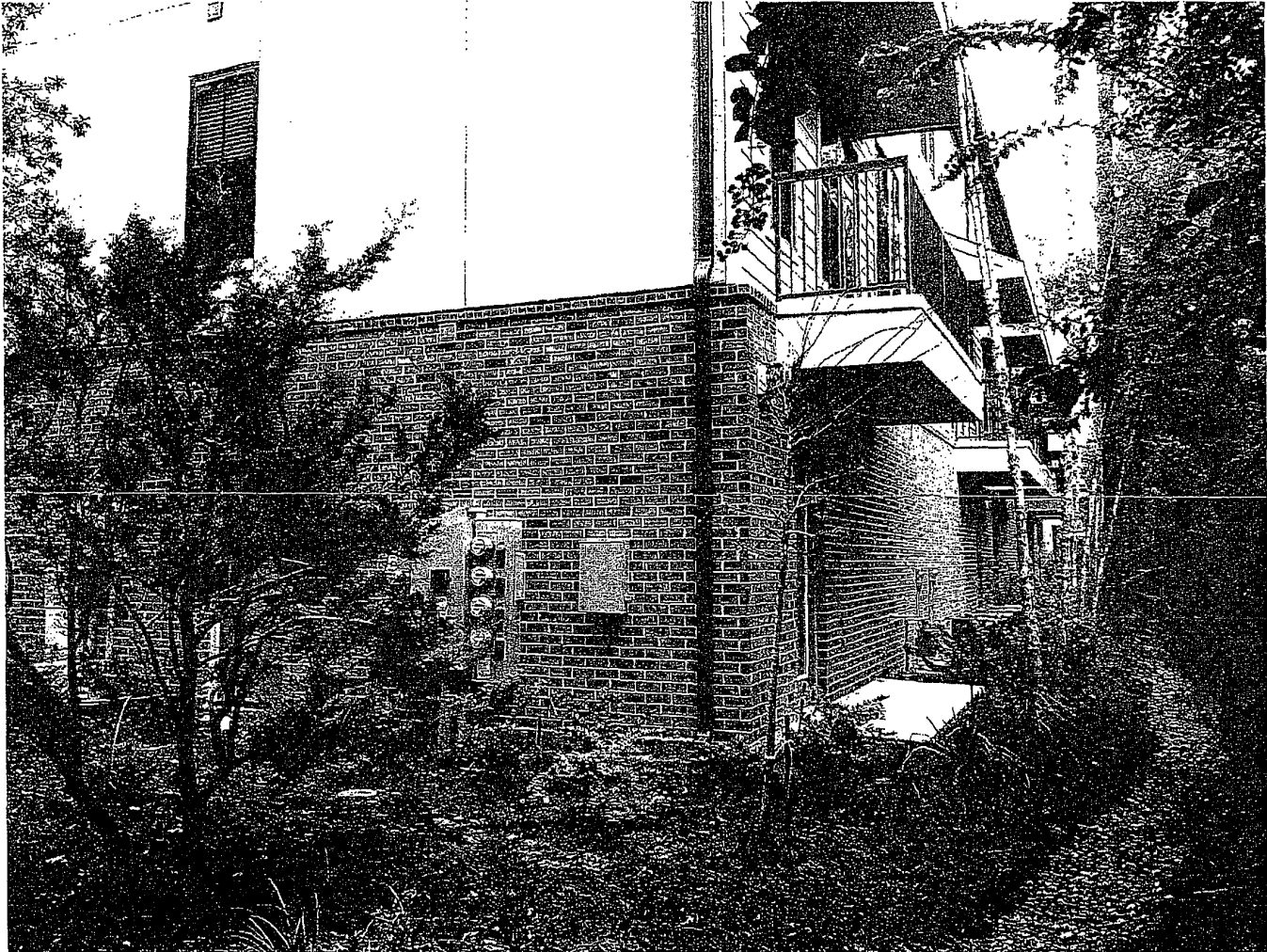
State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View 9/01/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 3

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 9/01/2015



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 4		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartment</u>		
A5. Latitude/Longitude: Lat. 29°46'37.8" Long. 95°37'30.6" Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		A9. For a building with an attached garage:
a) Square footage of crawlspace or enclosure(s) <u>N/A</u> sq ft		a) Square footage of attached garage <u>1,920</u> sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <u>N/A</u>		b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade <u>N/A</u>
c) Total net area of flood openings in A8.b <u>N/A</u> sq in		c) Total net area of flood openings in A9.b <u>N/A</u> sq in
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88.2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/AE, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88.2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

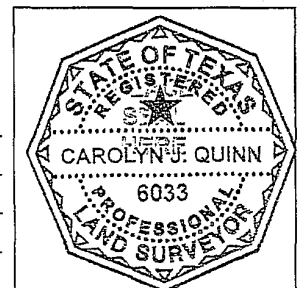
Check the measurement used.

a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.77</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.36</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>77.29</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>77.35</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>77.1</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>77.3</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>77.15</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.



Certifier's Name Carolyn J. Quinn		License Number 6033	
Title R.P.L.S.	Company Name Miller Survey Group		
Address 1760 W. Sam Houston Pkwy N.	City Houston	State Tx	ZIP Code 77043
Signature <i>Carolyn Quinn</i>	Date 10/13/15	Telephone (713) 413-1900	

ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 4		Policy Number:
City Houston	State Tx ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

C2(e)

Signature

Date 10/13/15

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address

City

State

ZIP Code

Signature

Date

Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

G7. This permit has been issued for: ☐ New Construction ☐ Substantial ImprovementG8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name	Title
Community Name	Telephone
Signature	Date
Comments	

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 4

Policy Number:

City Houston

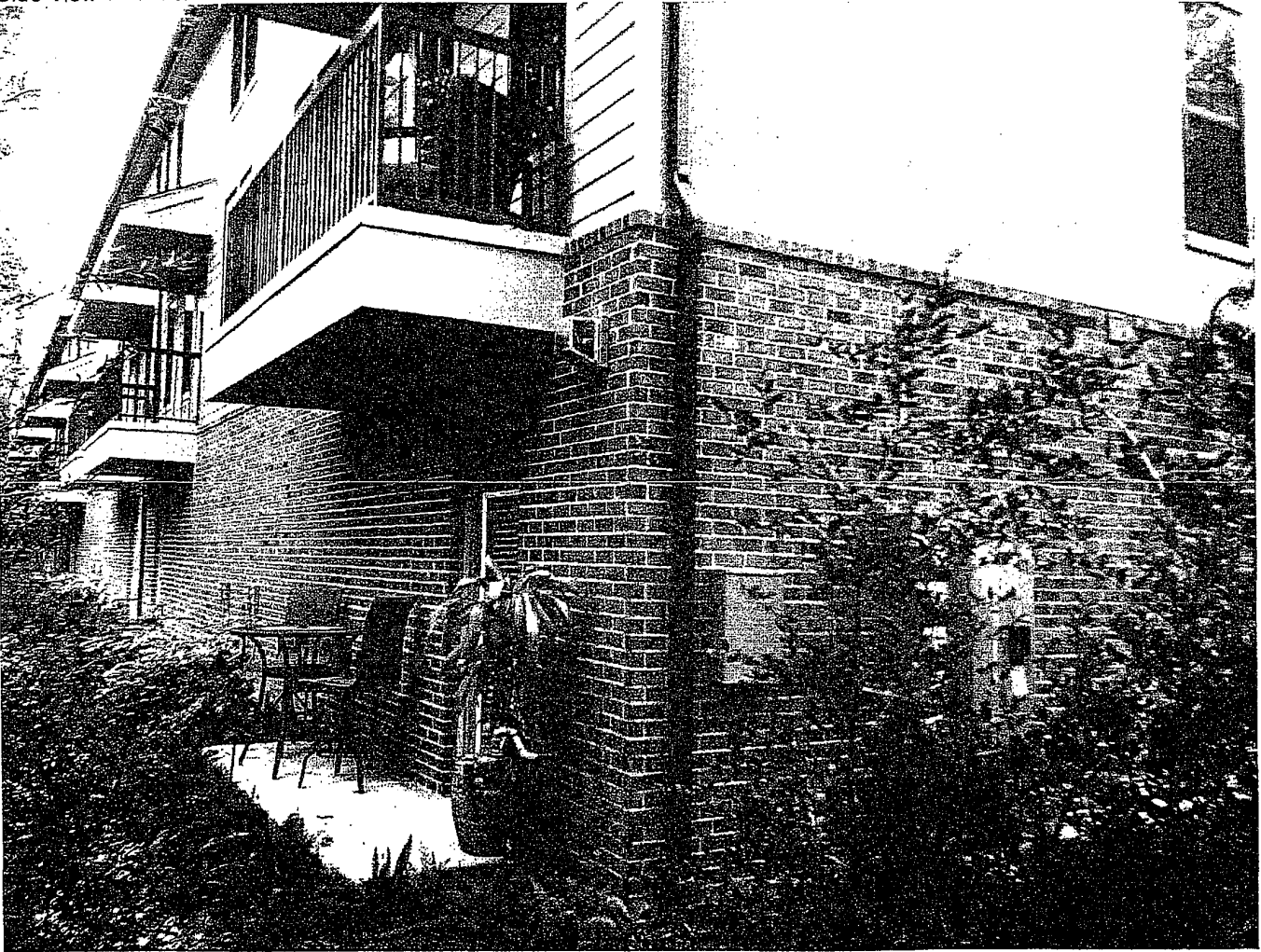
State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 9/01/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 4

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 9/01/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE**Important: Read the instructions on pages 1-9.**

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 5		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartment</u>		
A5. Latitude/Longitude: Lat. <u>29°46'37.8"</u> Long. <u>95°37'30.6"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		
a) Square footage of crawlspace or enclosure(s)	<u>N/A</u>	sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A8.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
A9. For a building with an attached garage:		
a) Square footage of attached garage	<u>2,400</u>	sq ft
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A9.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88.2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88.2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

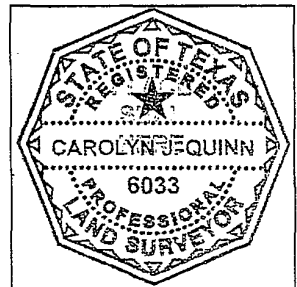
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.63</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.21</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>77.20</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>77.21</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>76.8</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>77.0</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>77.08</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available.
I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.

Certifier's Name Carolyn J. Quinn License Number 6033
Title R.P.L.S. Company Name Miller Survey Group
Address 1760 W. Sam Houston Pkwy N. City Houston State Tx ZIP Code 77043
Signature Carolyn J. Quinn Date 10/13/15 Telephone (713) 413-1900



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 5			Policy Number:
City Houston	State Tx	ZIP Code 77079	Company NAIC Number:

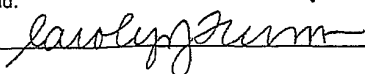
SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFC Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

C2(e)- A/C pad.

Signature



Date 10/13/15

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address

City

State

ZIP Code

Signature

Date

Telephone

Comments

☐ Check here if attachments.

SECTION G – COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

G7. This permit has been issued for: ☐ New Construction ☐ Substantial ImprovementG8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name

Title

Community Name

Telephone

Signature

Date

Comments

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 5

Policy Number:

City Houston

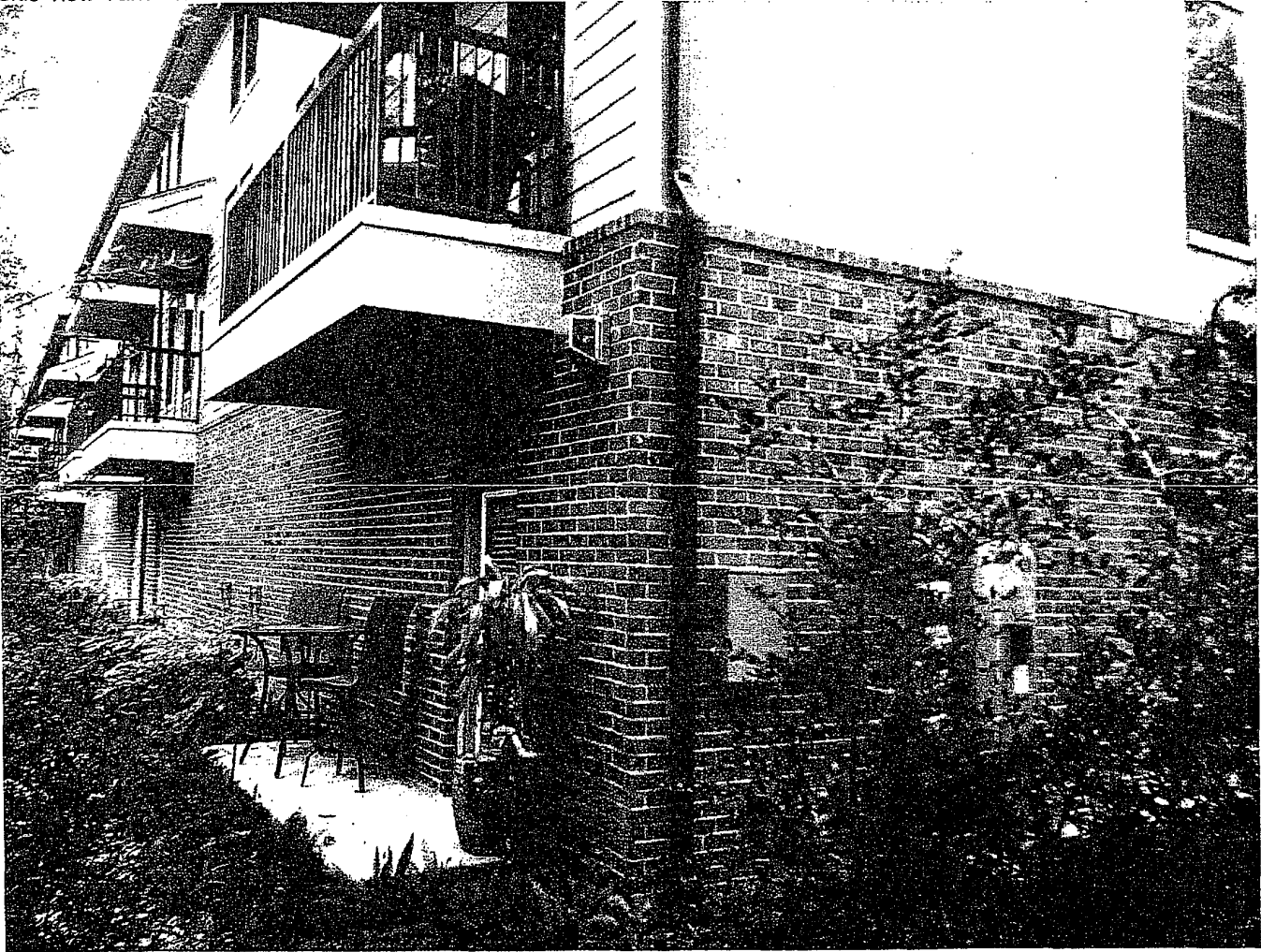
State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 9/01/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 5

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 9/01/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 6		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
Resv. A, Blk. 1, Mayde Creek Crossing

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) Apartments

A5. Latitude/Longitude: Lat. 29°46'37.8" Long. 95°37'30.6" Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1A

A8. For a building with a crawlspace or enclosure(s):

a) Square footage of crawlspace or enclosure(s)	<u>N/A</u>	sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A8.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

A9. For a building with an attached garage:

a) Square footage of attached garage	<u>8,090</u>	sq ft
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A9.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☒ FIS Profile ☐ FIRM ☐ Community Determined ☐ Other/Source: _____

B11. Indicate elevation datum used for BFE in Item B9: ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88.2001 ADJ

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date: _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88.2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

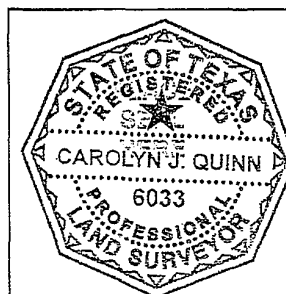
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.68</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.18</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>77.21</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>77.2</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>77.5</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.

Certifier's Name Carolyn J. Quinn		License Number 6033	
Title R.P.L.S.	Company Name Miller Survey Group		
Address 1760 W. Sam Houston Pkwy N.	City Houston	State Tx	ZIP Code 77043
Signature <u>Carolyn J. Quinn</u>	Date 10/13/15	Telephone (713) 413-1900	



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 6		Policy Number:
City Houston	State Tx ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

Signature

Date 10/13/15

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address City State ZIP Code

Signature Date Telephone

Comments

☐ Check here if attachments.

SECTION G – COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

- G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____
- G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____
- G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name Title

Community Name Telephone

Signature Date

Comments

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 6

Policy Number:

City Houston

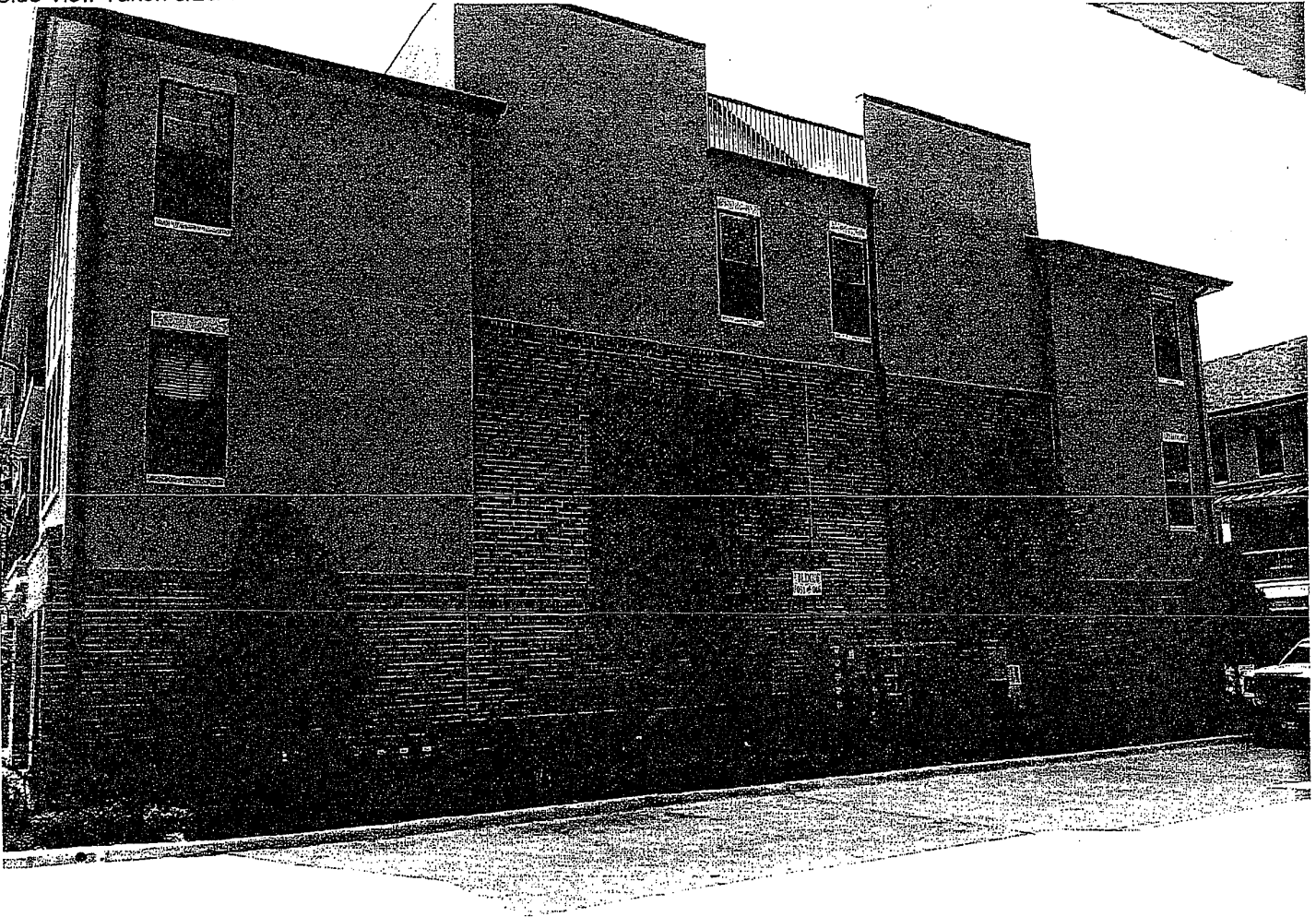
State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 8/28/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 6

Policy Number:

City Houston

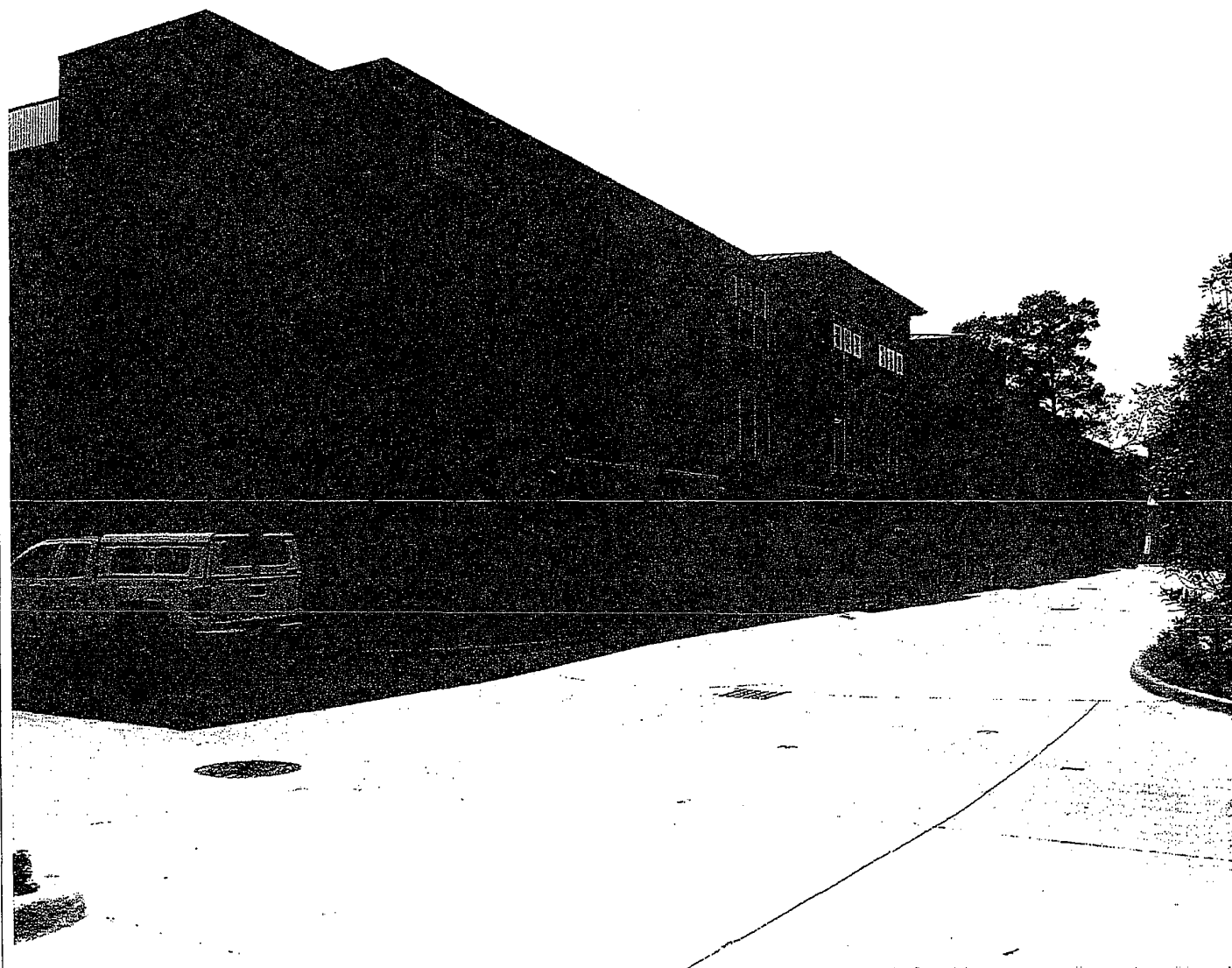
State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 8/28/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE**Important: Read the instructions on pages 1-9.**

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 7		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Residential</u>		
A5. Latitude/Longitude: Lat. <u>29°46'37.8"</u> Long. <u>95°37'30.6"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		A9. For a building with an attached garage:
a) Square footage of crawlspace or enclosure(s) <u>N/A</u> sq ft		a) Square footage of attached garage <u>8,090</u> sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <u>N/A</u>		b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade <u>N/A</u>
c) Total net area of flood openings in A8.b <u>N/A</u> sq in		c) Total net area of flood openings in A9.b <u>N/A</u> sq in
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88.2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88.2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

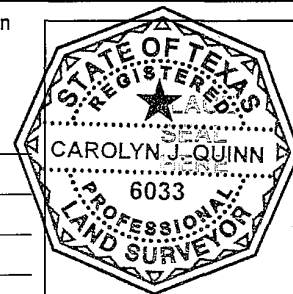
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.70</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.19</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>77.24</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>77.1</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>77.5</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.

Certifier's Name Carolyn J. Quinn License Number 6033
Title Survey Manager Company Name Miller Survey Group
Address 1760 W. Sam Houston Pkwy N. City Houston State Tx ZIP Code 77043
Signature Carolyn J. Quinn Date 10/05/2015 Telephone (713) 413-1900



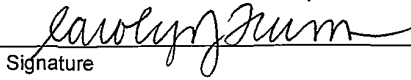
ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 7			Policy Number:
City Houston	State Tx	ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFC Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)



Date 10/05/2015

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address	City	State	ZIP Code
Signature	Date	Telephone	
Comments			

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement

G8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____

G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____

G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name	Title
Community Name	Telephone
Signature	Date
Comments	

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 7

City Houston

State Tx

ZIP Code 77079

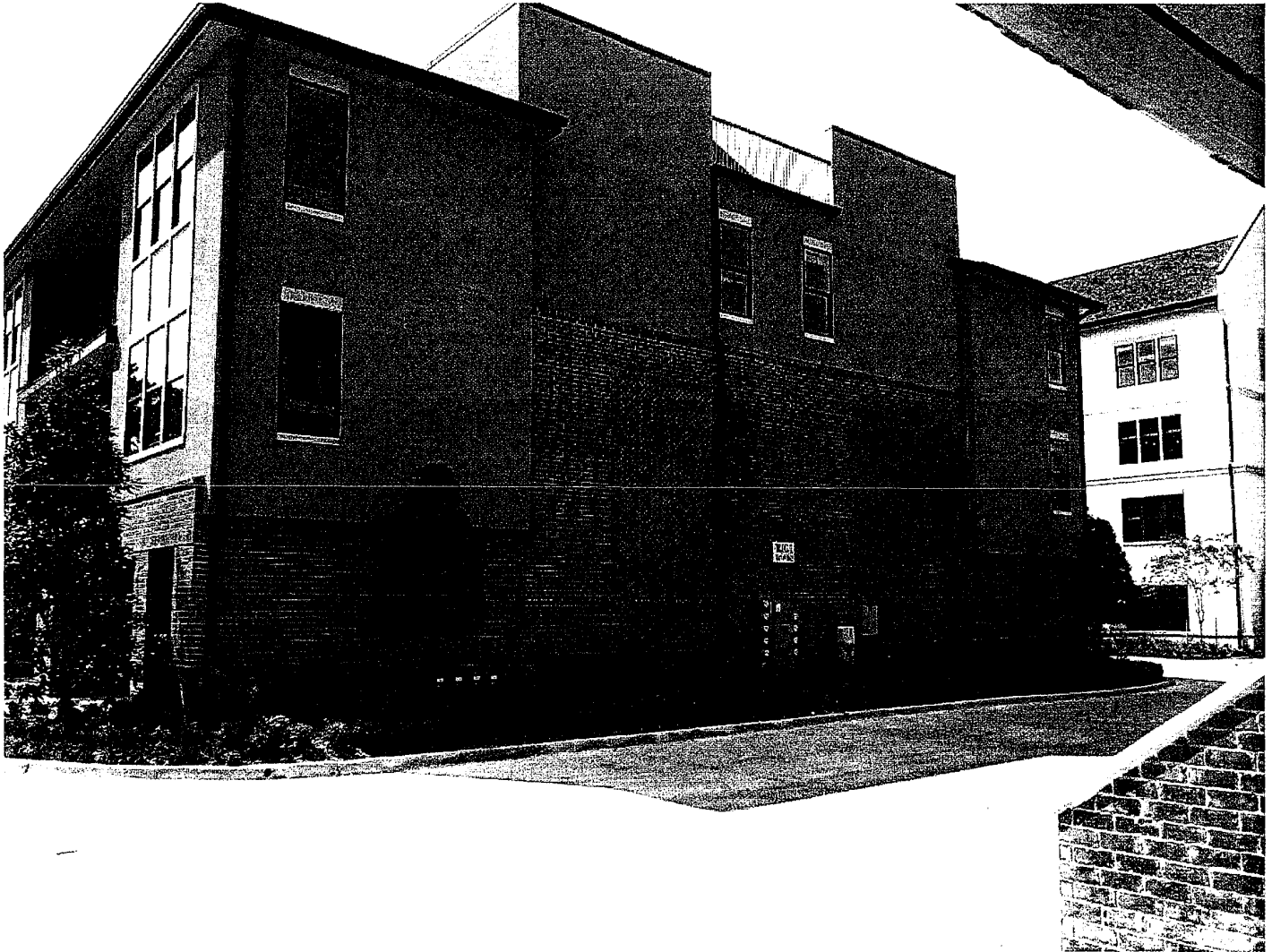
FOR INSURANCE COMPANY USE

Policy Number:

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 8/28/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 7

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 8/28/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

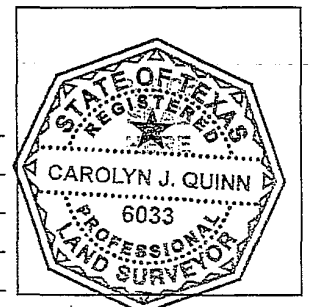
OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 8		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartment</u>		
A5. Latitude/Longitude: Lat. 29°46'37.8" Long. 95°37'30.6" Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		A9. For a building with an attached garage:
a) Square footage of crawlspace or enclosure(s) <u>N/A</u> sq ft		a) Square footage of attached garage <u>960</u> sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <u>N/A</u>		b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade <u>N/A</u>
c) Total net area of flood openings in A8.b <u>N/A</u> sq in		c) Total net area of flood openings in A9.b <u>N/A</u> sq in
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION					
B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88.2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)	
C1. Building elevations are based on: <input type="checkbox"/> Construction Drawings* <input type="checkbox"/> Building Under Construction* <input checked="" type="checkbox"/> Finished Construction *A new Elevation Certificate will be required when construction of the building is complete.	
C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters. Benchmark Utilized: <u>RM 210395</u> Vertical Datum: <u>NAVD 88 (2001 ADJ)</u> Indicate elevation datum used for the elevations in items a) through h) below. <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88.2001 ADJ</u> Datum used for building elevations must be the same as that used for the BFE.	
Check the measurement used.	
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.55</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.25</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>77.22</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>76.84</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>77.0</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>77.4</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>76.38</u> <input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION	
This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.	
<input checked="" type="checkbox"/> Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<input type="checkbox"/> Check here if attachments.	
Certifier's Name Carolyn J. Quinn	License Number 6033
Title R.P.L.S.	Company Name Miller Survey Group
Address 1760 W. Sam Houston Pkwy N.	City Houston State Tx ZIP Code 77043
Signature <u>Carolyn J. Quinn</u>	Date 10/16/15 Telephone (713) 413-1900



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 8			Policy Number:
City Houston	State Tx	ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

C2(e) - Generator Pad.

Signature

Date 10/16/15

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address City State ZIP Code

Signature Date Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

- G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____
- G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____
- G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name	Title
Community Name	Telephone
Signature	Date
Comments	

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 8

Policy Number:

City Houston

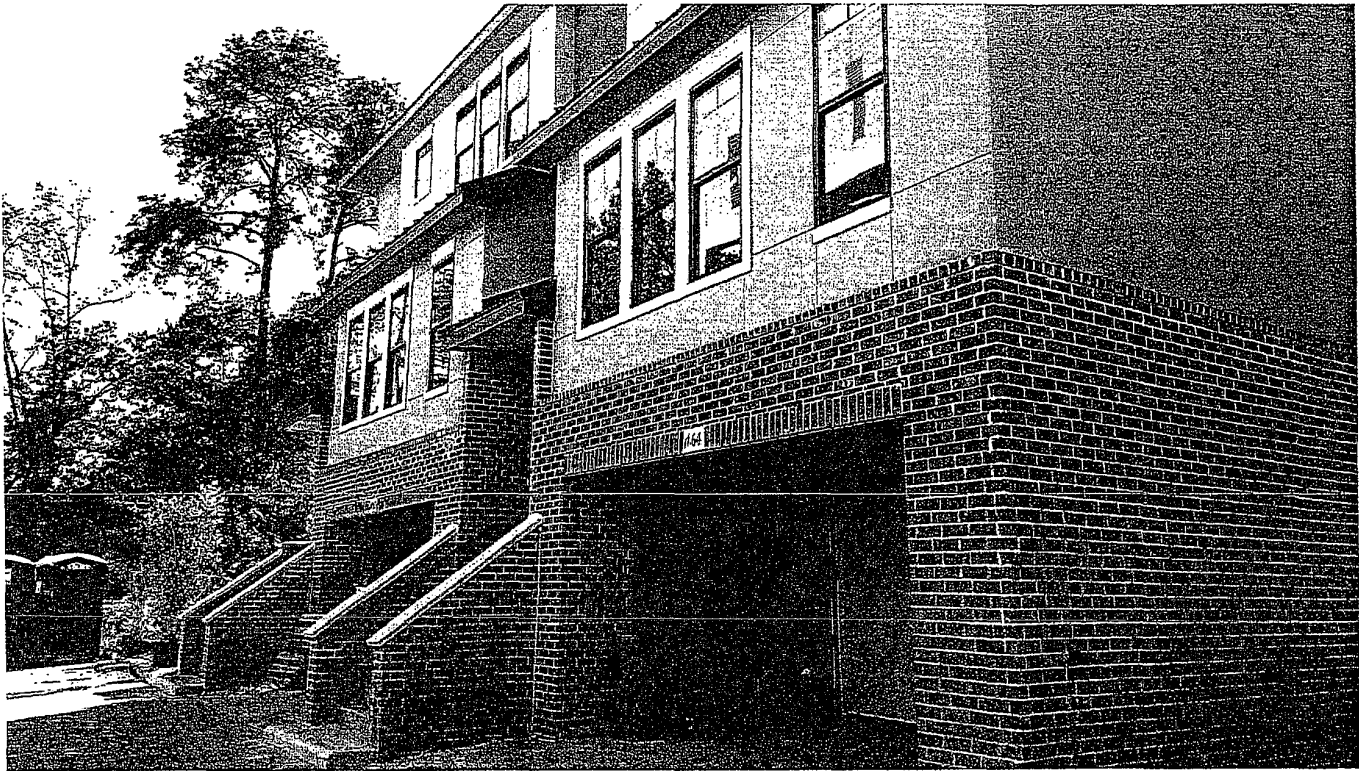
State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 10/14/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 8

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 10/14/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE**Important: Read the instructions on pages 1-9.**

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 9		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartments</u>		
A5. Latitude/Longitude: Lat. <u>29°46'37.8"</u> Long. <u>95°37'30.6"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		
a) Square footage of crawlspace or enclosure(s)	<u>N/A</u>	sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A8.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
A9. For a building with an attached garage:		
a) Square footage of attached garage	<u>2,880</u>	sq ft
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A9.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 06/09/2014	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88,2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88,2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

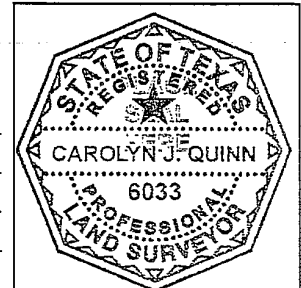
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.60</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.30</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>77.00</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>76.85</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>75.0</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>76.6</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>76.96</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.

Certifier's Name Brian E. Wilson License Number 5745
Title Survey Manager Company Name Miller Survey Group
Address 1760 W. Sam Houston Pkwy N. City Houston State Tx ZIP Code 77043
Signature Carolyn J. Quinn Date 10/16/15 Telephone (713) 413-1900



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 9			Policy Number:
City Houston	State Tx	ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

C2(e) - Generator Pad.

Signature

Date 10/16/15

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address City State ZIP Code

Signature Date Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

G7. This permit has been issued for: ☐ New Construction ☐ Substantial ImprovementG8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name Title

Community Name Telephone

Signature Date

Comments

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 9

Policy Number:

City Houston

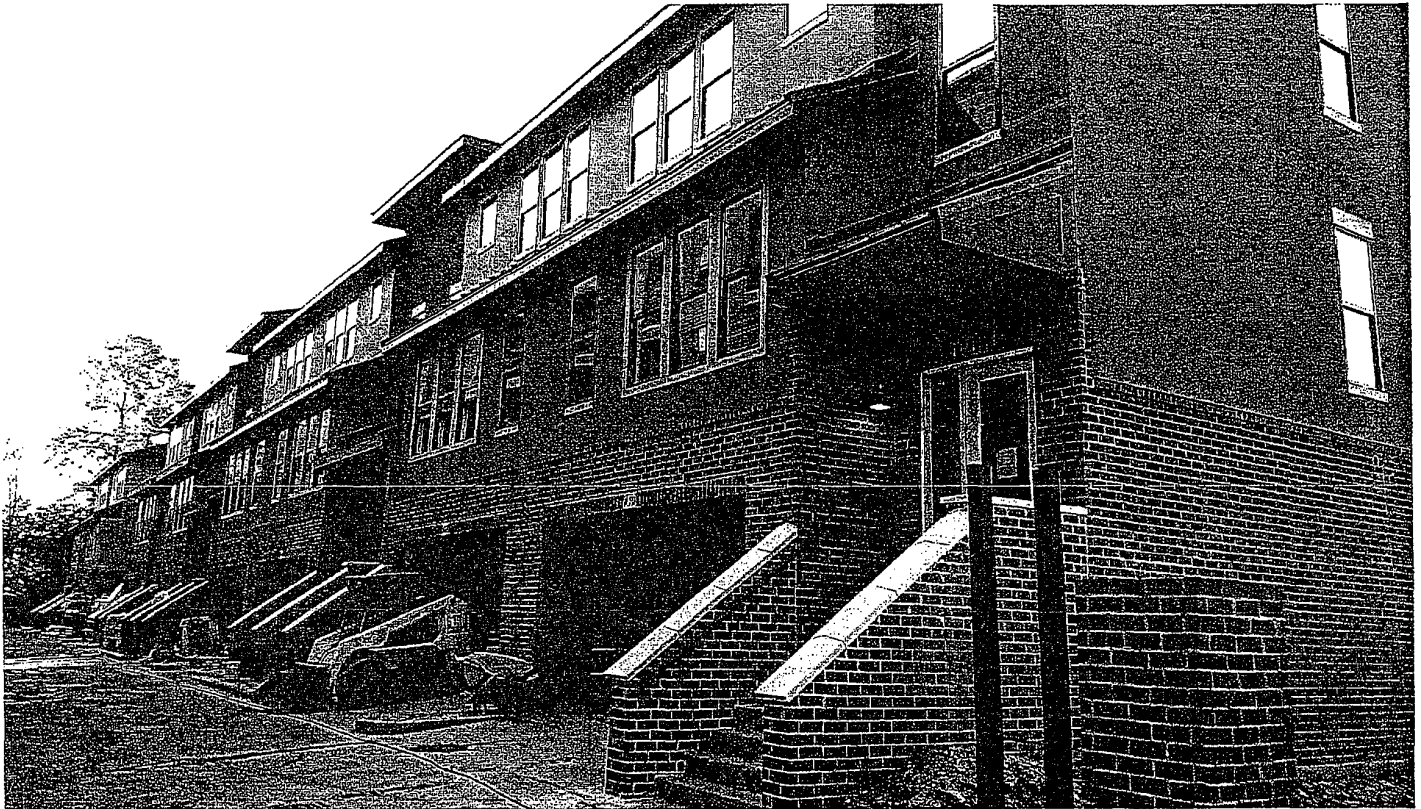
State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 10/14/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 9

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 10/14/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION

A1. Building Owner's Name Memorial SMC Investment 2013 LP		FOR INSURANCE COMPANY USE
		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 10-A		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartments</u>		
A5. Latitude/Longitude: Lat. <u>29°46'40.0"</u> Long. <u>95°37'28.8"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		
a) Square footage of crawlspace or enclosure(s) <u>N/A</u> sq ft		
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <u>N/A</u>		
c) Total net area of flood openings in A8.b <u>N/A</u> sq in		
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
A9. For a building with an attached garage:		
a) Square footage of attached garage <u>N/A</u> sq ft		
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade <u>N/A</u>		
c) Total net area of flood openings in A9.b <u>N/A</u> sq in		
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88,2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88,2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

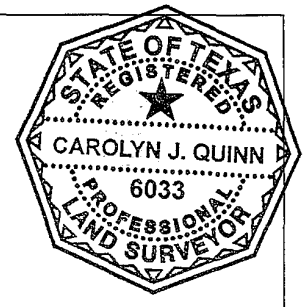
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.14</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.7</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>77.39</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>76.6</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>76.8</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>77.01</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.

Certifier's Name Carolyn J. Quinn		License Number 6033	
Title R.P.L.S.	Company Name Miller Survey Group		
Address 1760 W. Sam Houston Pkwy N.	City Houston	State Tx	ZIP Code 77043
Signature <i>Carolyn J. Quinn</i>	Date 8/24/15	Telephone (713) 413-1900	



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 10-A		Policy Number:
City Houston	State Tx ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

C2(e) - A/C Pad.

Signature

Date 8/24/15

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address

City

State

ZIP Code

Signature

Date

Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

- G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____
- G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____
- G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name

Title

Community Name

Telephone

Signature

Date

Comments

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 10-A

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 8/21/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 10-A

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 8/21/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE**Important: Read the instructions on pages 1-9.**

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A – PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 10-B		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartment</u>		
A5. Latitude/Longitude: Lat. <u>29°46'40.0"</u> Long. <u>95°37'28.8"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		A9. For a building with an attached garage:
a) Square footage of crawlspace or enclosure(s) <u>N/A</u> sq ft		a) Square footage of attached garage <u>N/A</u> sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <u>N/A</u>		b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade <u>N/A</u>
c) Total net area of flood openings in A8.b <u>N/A</u> sq in		c) Total net area of flood openings in A9.b <u>N/A</u> sq in
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

SECTION B – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88, 2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C – BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1–A30, AE, AH, A (with BFE), VE, V1–V30, V (with BFE), AR, AR/A, AR/AE, AR/A1–A30, AR/AH, AR/AO. Complete Items C2.a–h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88, 2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

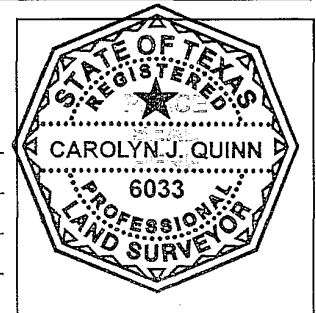
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.14</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.7</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>77.39</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>76.8</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>76.9</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>77.04</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available.
I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a
☐ Check here if attachments. licensed land surveyor? ☐ Yes ☒ No

Certifier's Name Carolyn J. Quinn		License Number 6033	
Title R.P.L.S.	Company Name Miller Survey Group		
Address 1760 W. Sam Houston Pkwy N.	City Houston	State Tx	ZIP Code 77043
Signature <i>Carolyn J. Quinn</i>	Date 8/28/15	Telephone (713) 413-1900	



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 10-B		Policy Number:
City Houston	State Tx ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCB Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

C2(e) - A/C Pad.

Signature

Date 8/28/15

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address

City

State

ZIP Code

Signature

Date

Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

G7. This permit has been issued for: ☐ New Construction ☐ Substantial ImprovementG8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name	Title
Community Name	Telephone
Signature	Date
Comments	

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 10-B

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 8/21/15



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 10-B

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 8/21/15



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 11a		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartment</u>		
A5. Latitude/Longitude: Lat. <u>29°46'37.8"</u> Long. <u>95°37'30.6"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		A9. For a building with an attached garage:
a) Square footage of crawlspace or enclosure(s) <u>N/A</u> sq ft		a) Square footage of attached garage <u>N/A</u> sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade <u>N/A</u>		b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade <u>N/A</u>
c) Total net area of flood openings in A8.b <u>N/A</u> sq in		c) Total net area of flood openings in A9.b <u>N/A</u> sq in
d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		d) Engineered flood openings? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88, 2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☒ Building Under Construction* ☐ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88, 2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

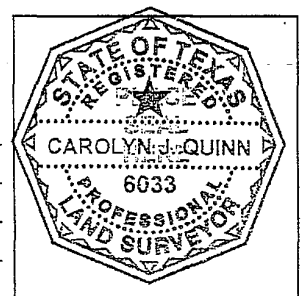
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.04</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.77</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>76.88</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>75.3</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>76.4</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>77.01</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available.
I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.

Certifier's Name Carolyn J. Quinn License Number 6033
Title R.P.L.S. Company Name Miller Survey Group
Address 1760 W. Sam Houston Pkwy N. City Houston State Tx ZIP Code 77043
Signature Carolyn J. Quinn Date 10/27/14 Telephone (713) 413-1900



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 11a		Policy Number:
City Houston	State Tx ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

Signature 

Date 10/27/14

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address City State ZIP Code

Signature Date Telephone

Comments

☐ Check here if attachments.

SECTION G – COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

- G7. This permit has been issued for: ☐ New Construction ☐ Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____
- G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____
- G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name	Title
Community Name	Telephone
Signature	Date
Comments	

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 11a

Policy Number:

City Houston

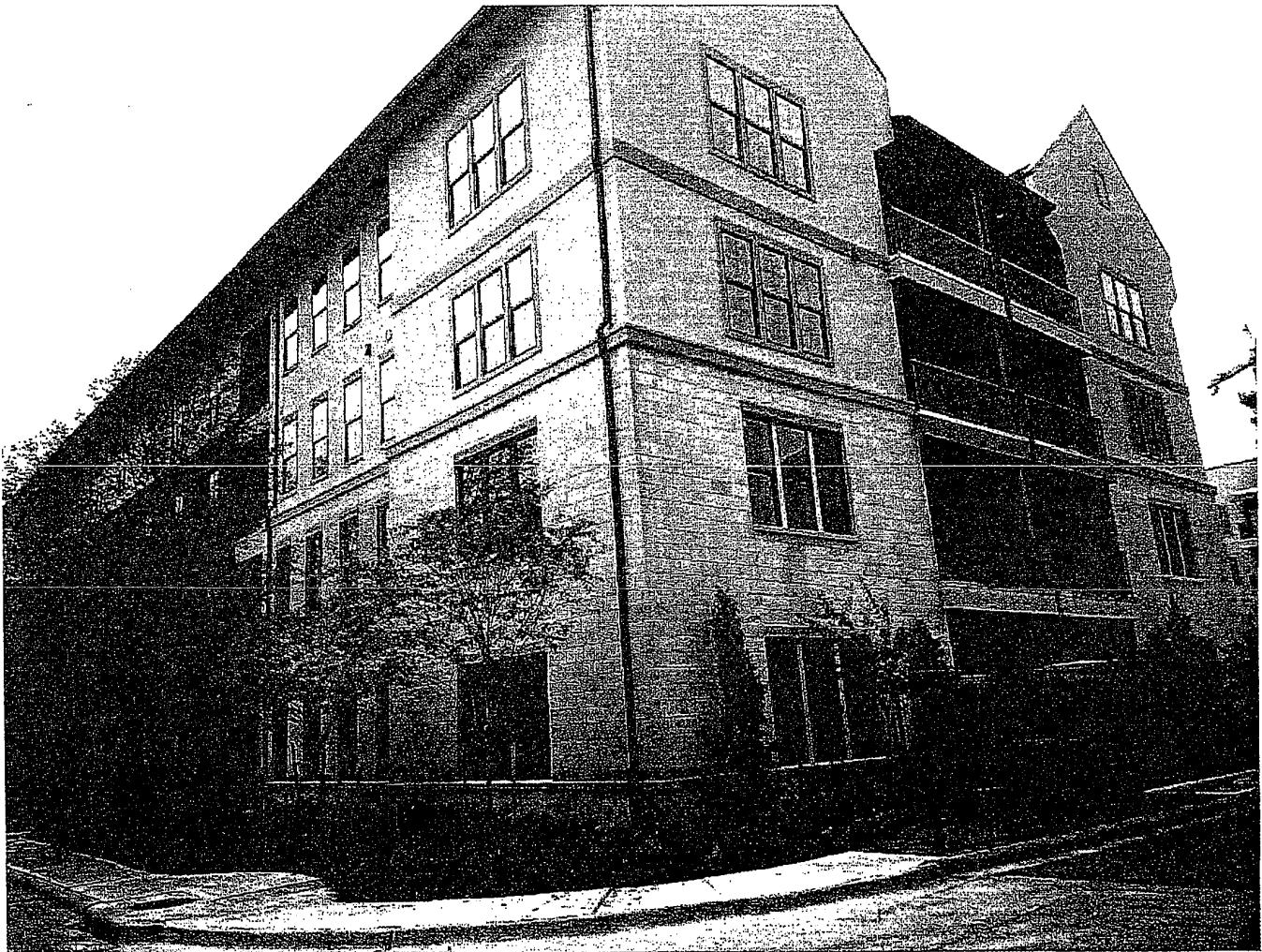
State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 8/21/2015



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 11a

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 8/21/2015



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name Memorial SMC Investment 2013 LP		Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 11b		Company NAIC Number:
City Houston	State Tx	ZIP Code 77079
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.) Resv. A, Blk. 1, Mayde Creek Crossing		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) <u>Apartments</u>		
A5. Latitude/Longitude: Lat. <u>29°46'37.8"</u> Long. <u>95°37'30.6"</u> Horizontal Datum: <input type="checkbox"/> NAD 1927 <input checked="" type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number <u>1A</u>		
A8. For a building with a crawlspace or enclosure(s):		
a) Square footage of crawlspace or enclosure(s)	<u>N/A</u>	sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A8.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
A9. For a building with an attached garage:		
a) Square footage of attached garage	<u>N/A</u>	sq ft
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade	<u>N/A</u>	
c) Total net area of flood openings in A9.b	<u>N/A</u>	sq in
d) Engineered flood openings?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number City of Houston - 480296		B2. County Name Harris		B3. State Tx	
B4. Map/Panel Number 48201C0620	B5. Suffix L	B6. FIRM Index Date 05/04/2015	B7. FIRM Panel Effective/Revised Date 06/18/2007	B8. Flood Zone(s) X (Shaded)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth) 75.72'
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input checked="" type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____					
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input checked="" type="checkbox"/> Other/Source: <u>NAVD88,2001 ADJ</u>					
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.
Benchmark Utilized: RM 210395 Vertical Datum: NAVD 88 (2001 ADJ)
Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88,2001 ADJ
Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

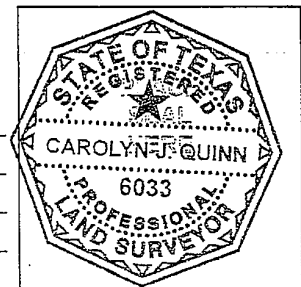
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<u>77.04</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<u>88.77</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<u>N/A</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<u>76.88</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<u>76.3</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<u>77.0</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<u>76.90</u>	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.

Certifier's Name Brian E. Wilson License Number 5745
Title Survey Manager Company Name Miller Survey Group
Address 1760 W. Sam Houston Pkwy N. City Houston State Tx ZIP Code 77043
Signature Carolyn J. Quinn Date 10/13/15 Telephone (713) 413-1900



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 11b		Policy Number:
City Houston	State Tx ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

c2(e) - Generator pad.

Signature

Date 10/13/2015

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address

City

State

ZIP Code

Signature

Date

Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
-------------------	------------------------	---

G7. This permit has been issued for: ☐ New Construction ☐ Substantial ImprovementG8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name

Title

Community Name

Telephone

Signature

Date

Comments

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 11b

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 8/21/2015



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 11b

Policy Number:

City Houston

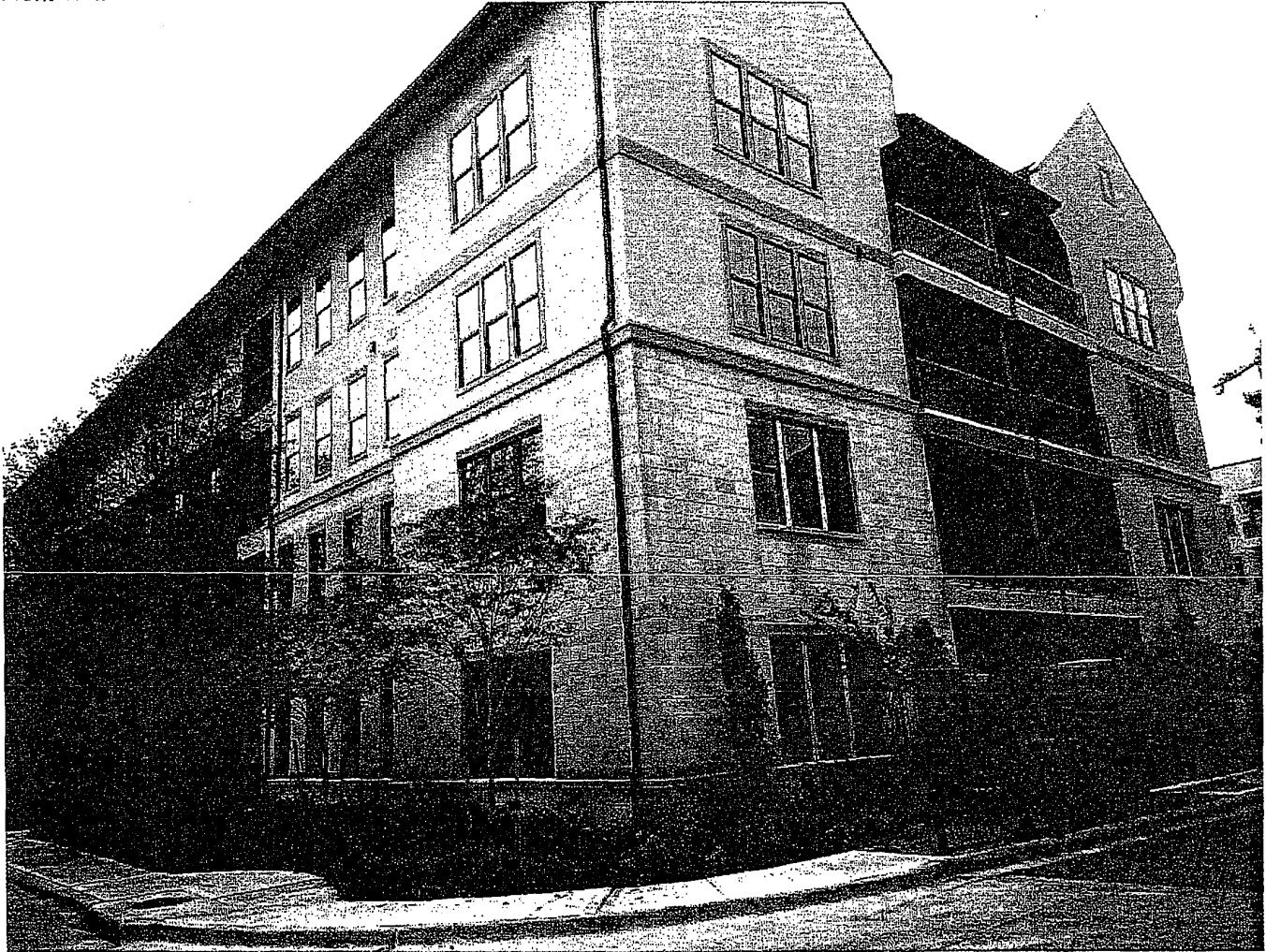
State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 8/21/2015



U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expiration Date: July 31, 2015

SECTION A - PROPERTY INFORMATION

FOR INSURANCE COMPANY USE

A1. Building Owner's Name Memorial SMC Investment 2013 LP

Policy Number:

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 11c

Company NAIC Number:

City Houston

State Tx

ZIP Code 77079

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
Resv. A, Blk. 1, Mayde Creek Crossing

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) Apartments

A5. Latitude/Longitude: Lat. 29°46'37.8" Long. 95°37'30.6" Horizontal Datum: ☐ NAD 1927 ☒ NAD 1983

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number 1A

A8. For a building with a crawlspace or enclosure(s):

- a) Square footage of crawlspace or enclosure(s) N/A sq ft
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade N/A
c) Total net area of flood openings in A8.b N/A sq in
d) Engineered flood openings? ☐ Yes ☒ No

A9. For a building with an attached garage:

- a) Square footage of attached garage N/A sq ft
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade N/A
c) Total net area of flood openings in A9.b N/A sq in
d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number
City of Houston - 480296

B2. County Name
Harris

B3. State
Tx

B4. Map/Panel Number
48201C0620

B5. Suffix
L

B6. FIRM Index Date
05/04/2015

B7. FIRM Panel
Effective/Revised Date
06/18/2007

B8. Flood
Zone(s)
X (Shaded)

B9. Base Flood Elevation(s) (Zone
AO, use base flood depth)
75.72'

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.

☒ FIS Profile ☐ FIRM ☐ Community Determined ☐ Other/Source: _____

B11. Indicate elevation datum used for BFE in Item B9: ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88,2001 ADJ

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date: _____ ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction

*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations - Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. In Puerto Rico only, enter meters.

Benchmark Utilized: RM 210395

Vertical Datum: NAVD 88 (2001 ADJ)

Indicate elevation datum used for the elevations in items a) through h) below. ☐ NGVD 1929 ☐ NAVD 1988 ☒ Other/Source: NAVD88,2001 ADJ

Datum used for building elevations must be the same as that used for the BFE.

Check the measurement used.

- a) Top of bottom floor (including basement, crawlspace, or enclosure floor) 77.04 ☒ feet ☐ meters
b) Top of the next higher floor 88.77 ☒ feet ☐ meters
c) Bottom of the lowest horizontal structural member (V Zones only) N/A ☒ feet ☐ meters
d) Attached garage (top of slab) N/A ☒ feet ☐ meters
e) Lowest elevation of machinery or equipment servicing the building 76.88 ☒ feet ☐ meters
(Describe type of equipment and location in Comments)
f) Lowest adjacent (finished) grade next to building (LAG) 76.3 ☒ feet ☐ meters
g) Highest adjacent (finished) grade next to building (HAG) 77.0 ☒ feet ☐ meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support 76.90 ☒ feet ☐ meters

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.

☒ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No
☐ Check here if attachments.

Certifier's Name Carolyn J. Quinn

License Number 6033

Title R.P.L.S.

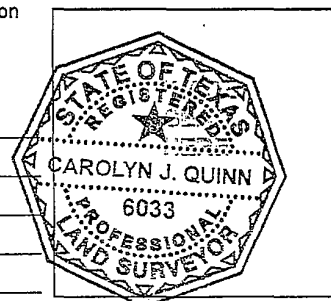
Company Name Miller Survey Group

Address 1760 W. Sam Houston Pkwy N., City Houston

State Tx ZIP Code 77043

Signature Carolyn J. Quinn Date 10/13/15

Telephone (713) 413-1900



ELEVATION CERTIFICATE, page 2

IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. 777 S. Mayde Creek Dr., Building 11b		Policy Number:
City Houston	State Tx ZIP Code 77079	Company NAIC Number:

SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments Benchmark: Floodplain Reference Mark No. 210395, HCFCD Brass Disk stamped U100-BM01, on bridge at Memorial Drive and Langham Creek, located on downstream side of bridge at stream centerline. Elev.= 79.42' (NAVD 1988, 2001 Adj.)

c2(e) - Generator pad.

Signature

Date 10/13/2015

SECTION E – BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

For Zones AO and A (without BFE), complete Items E1–E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1–E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- b) Top of bottom floor (including basement, crawlspace, or enclosure) is _____ ☐ feet ☐ meters ☐ above or ☐ below the LAG.
- E2. For Building Diagrams 6–9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8–9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E3. Attached garage (top of slab) is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is _____ ☐ feet ☐ meters ☐ above or ☐ below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G.

SECTION F – PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. The statements in Sections A, B, and E are correct to the best of my knowledge.

Property Owner's or Owner's Authorized Representative's Name

Address

City

State

ZIP Code

Signature

Date

Telephone

Comments

☐ Check here if attachments.**SECTION G – COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8–G10. In Puerto Rico only, enter meters.

- G1. ☐ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3. ☐ The following information (Items G4–G10) is provided for community floodplain management purposes.

G4. Permit Number

G5. Date Permit Issued

G6. Date Certificate Of Compliance/Occupancy Issued

G7. This permit has been issued for: ☐ New Construction ☐ Substantial ImprovementG8. Elevation of as-built lowest floor (including basement) of the building: _____ ☐ feet ☐ meters Datum _____G9. BFE or (in Zone AO) depth of flooding at the building site: _____ ☐ feet ☐ meters Datum _____G10. Community's design flood elevation: _____ ☐ feet ☐ meters Datum _____

Local Official's Name

Title

Community Name

Telephone

Signature

Date

Comments

☐ Check here if attachments.

ELEVATION CERTIFICATE, page 3

Building Photographs

See Instructions for Item A6.

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 11c

Policy Number:

City Houston

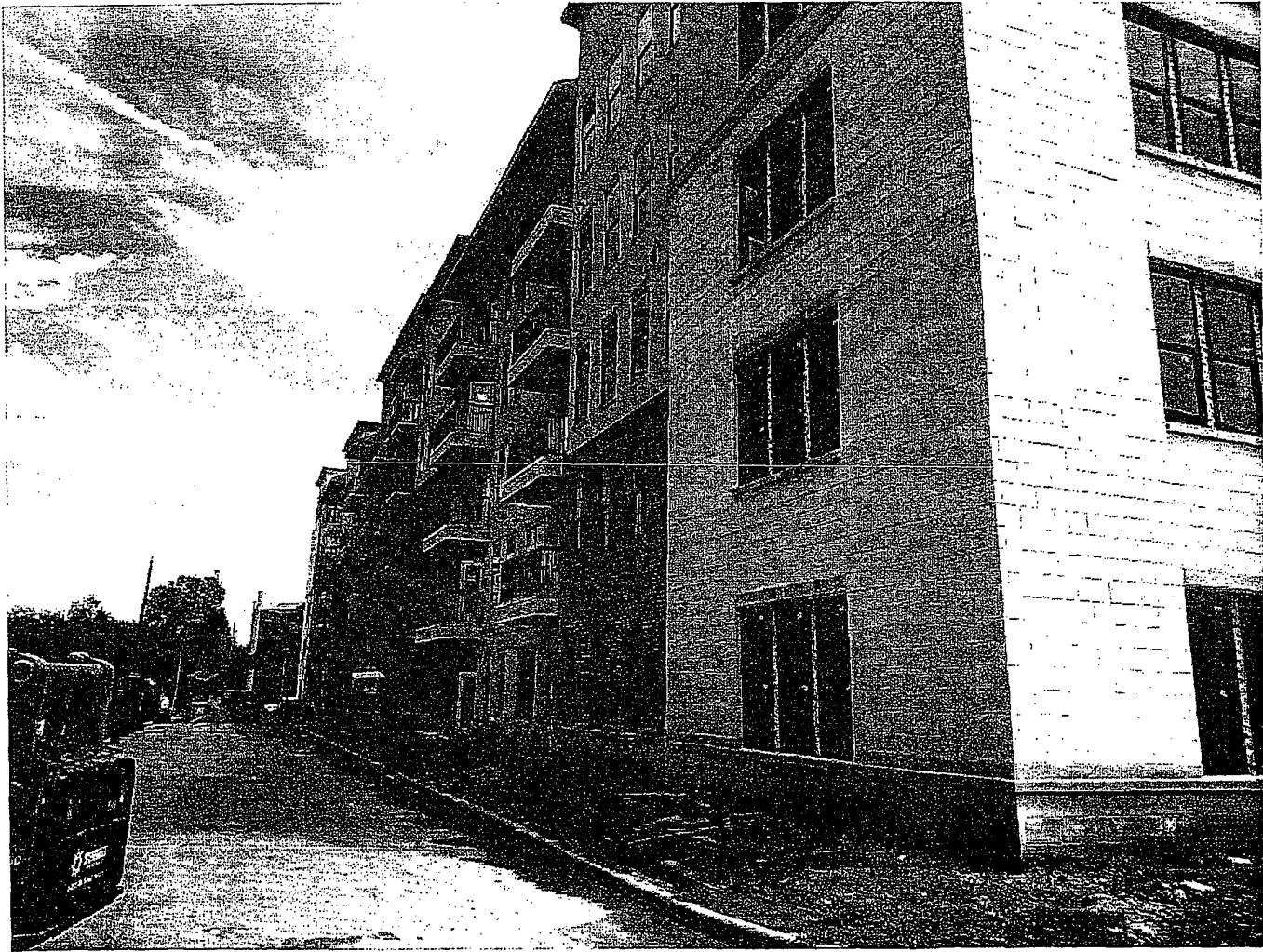
State Tx

ZIP Code 77079

Company NAIC Number:

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8. If submitting more photographs than will fit on this page, use the Continuation Page.

Side View Taken 8/21/2015



ELEVATION CERTIFICATE, page 4

Building Photographs

Continuation Page

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE

Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
777 S. Mayde Creek Dr., Building 11c

Policy Number:

City Houston

State Tx

ZIP Code 77079

Company NAIC Number:

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A8.

Front View Taken 8/21/2015



IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re **DOWNSTREAM ADDICKS
AND BARKER (TEXAS) FLOOD-
CONTROL RESERVOIRS**

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Sub-Master Docket No. 1:17-9002L

THIS DOCUMENT RELATES TO:

ALL DOWNSTREAM CASES

**17-1235L; Virginia and Arnold
Milton**

INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Virginia Milton and Arnold Milton
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):

850 Silvergate Dr., Houston, TX 77079-5068
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs:

None.
4. County Property Parcel Identification number¹: 1075160000010

¹ County Property Parcel Identification Numbers are available at [the FBCAD website](#) and [the HCAD website](#).

5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey (i.e. how deep was the water over time, and how much, and what parts, of your property did it cover):

On August 28, 2017 after 12:00 a.m. water began entering our home. The water reached 4 feet 2.4 inches inside the house. The property was flooded from August 28, 2017 to September 10, 2017.

6. If known, describe the date and extent of previous Property flooding (if any):

None.

7. As of August 24, 2017, was the Property located in: the 100-year floodplain ☐; the 500-year floodplain ☒; no known floodplain ☐.

8. When was the Property purchased or leased by you, or do you have some other type of property interest?

Purchased on April 19, 1978.

9. What is the elevation of the Property according to this website²?

24.0 meter or 78.6 feet.

10. Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes or a floodplain certificate)? If so, please provide

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php

the source and date of the information used to determine the elevation.

No. _____

11. Nature of Property interest (check all that apply): residential ☒; commercial ☐; industrial ☐;
owner ☒; renter ☐.

12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved):

Improved.

13. Is the Property currently listed on MLS for sale?

No

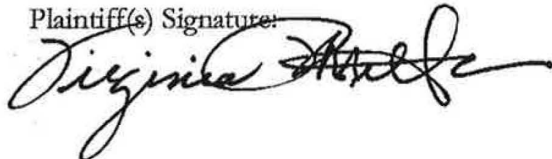

14. Has the Property been sold since Tropical Storm Harvey? No

15. Was there flood insurance for the Property during Tropical Storm Harvey? No

Plaintiff(s) Name: Virginia Milton and Arnold Milton

Attorney Firm Name: Fleming, Nolen & Jez, L.L.P.

Plaintiff(s) Signature:

Date: 02/15/2018

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In Re ADDICKS AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIR

Master Docket No. 17-3000L

THIS DOCUMENT APPLIES TO:

ALL CASES

INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Jennifer Shipos
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the USACE's operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):
931 Bayou Parkway, Houston, Texas 77077.
3. County Property Parcel Identification number¹: 1161720120027
4. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey: As of August 27, 2017, Ms. Shipos' property had not flooded due to Hurricane Harvey. Ms. Shipos' property was inundated, destroyed, substantially damaged, and/or devalued as a direct result of the Government's intentional release of flood water from the reservoirs into Buffalo Bayou on or about August 27, 2017 to September 2017. Floodwaters occupied the property from on or about August 29, 2017 to September 4, 2017.

¹ County Property Parcel Identification Numbers are available at [the FBCAD website](#) and [the HCAD website](#).



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5. If known, describe the date and extent of previous Property flooding (if any): None
6. As of August 24, 2017, was the Property located in: the 100-year floodplain X; the 500-year floodplain _____; no known floodplain _____.
7. When was the Property purchased or leased by you, or do you have some other type of property interest Property was acquired in or around December 1996, with ownership.
8. What is the elevation of the Property according to this website²? 24.5 meters or 80.4 feet
Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes)? If so, please provide the source and date of the information used to determine the elevation. _____
9. Nature of Property interest (check all that apply): residential X; commercial _____; industrial _____; owner X; renter _____.
10. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved):
Improved, excellent, remodeled
11. Is the Property currently listed on MLS for sale? No
12. Has the Property been sold since Tropical Storm Harvey? No
13. Was there flood insurance for the Property during Tropical Storm Harvey? Yes X No _____

Please contact the undersigned should you have any questions or wish to discuss further.

Very truly yours,

NEEL, HOOPER & BANES, P.C.

By 
Bryant S. Banes

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php

*****PROTECTED MATERIAL*****

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In Re ADDICKS AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIR

Master Docket No. 17-3000L

THIS DOCUMENT APPLIES TO:

ALL CASES

AMENDED INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Jennifer Shipos
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the USACE's operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):
931 Bayou Parkway, Houston, Texas 77077.
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs: _____

4. County Property Parcel Identification number¹: 1161720120027
5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey: As of August 27, 2017, Ms. Shipos' property had not flooded due to Hurricane Harvey. Ms. Shipos' property was inundated, destroyed,

¹ County Property Parcel Identification Numbers are available at the FBCAD website and the HCAD website.

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*****PROTECTED MATERIAL*****

substantially damaged, and/or devalued as a direct result of the Government's intentional release of flood water from the reservoirs into Buffalo Bayou on or about August 27, 2017 to September 2017. Floodwaters occupied the property from on or about August 29, 2017 to September 4, 2017.

6. If known, describe the date and extent of previous Property flooding (if any): None.
7. As of August 24, 2017, was the Property located in: the 100-year floodplain X; the 500-year floodplain _____; no known floodplain _____.
8. When was the Property purchased or leased by you, or do you have some other type of property interest Property was acquired in or around December 1996, with ownership.
9. What is the elevation of the Property according to this website²? 24.5 meters or 80.4 feet
10. Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes)? If so, please provide the source and date of the information used to determine the elevation. 75.8' Elevation Certificate dated April 4, 2018
11. Nature of Property interest (check all that apply): residential X; commercial _____; industrial _____; owner X; renter _____.
12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved): Improved, excellent, remodeled.
13. Is the Property currently listed on MLS for sale? No
14. Has the Property been sold since Tropical Storm Harvey? No
15. Was there flood insurance for the Property during Tropical Storm Harvey? Yes X No _____

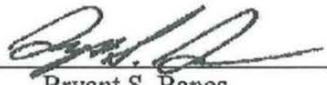
² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php

*****PROTECTED MATERIAL*****

Please contact the undersigned should you have any questions or wish to discuss further.

Very truly yours,

NEEL, HOOPER & BANES, P.C.

By 
Bryant S. Banes

Plaintiff(s) Name: Jennifer Shipos

Plaintiff(s) Signature: Jennifer M Shipos

Date: 4/10/18

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re DOWNSTREAM ADDICKS
AND BARKER (TEXAS) FLOOD-
CONTROL RESERVOIRS

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Sub-Master Docket No. 1:17-9002L

THIS DOCUMENT RELATES TO:

ALL DOWNSTREAM CASES

17-9002L

INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Peter and Zhennia Silverman
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):

12515 Westerley Lane Houston, TX 77077
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs:

N/A
4. County Property Parcel Identification number¹: 0990020000032

¹ County Property Parcel Identification Numbers are available at [the FBCAD website](#) and [the HCAD website](#).

5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey (i.e. how deep was the water over time, and how much, and what parts, of your property did it cover):

The water likely entered the house on either August 29 or August 30 (when a neighbor returned by boat to find house flooded). When we returned to the house on September 8, the water had just receded (the floor was wet). The high water mark was about 12 inches in the house in most places, but it varied a bit.

6. If known, describe the date and extent of previous Property flooding (if any):

Yes; there have been small amounts of flooding, controllable with towels and mopping, from heavy rainfall events and lack of drainage in 1992, but not from Buffalo Bayou. The drainage issues have since been fixed. There was no flooding from Tropical Storm Harvey.

7. As of August 24, 2017, was the Property located in: the 100-year floodplain ☐; the 500-year floodplain ☐; no known floodplain ☒.

8. When was the Property purchased or leased by you, or do you have some other type of property interest?

Purchased August 13, 1990

9. What is the elevation of the Property according to this website²?

75.3 feet

10. Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes or a floodplain certificate)? If so, please provide the source and date of the information used to determine the elevation.

Slab elevation is 75.09 feet; South Texas Surveying Associates, Inc.; December 17, 2017

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php

11. Nature of Property interest (check all that apply): residential ☒; commercial ☐; industrial ☐;
owner ☒; renter ☐.
12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved):
Improved
13. Is the Property currently listed on MLS for sale?
No
14. Has the Property been sold since Tropical Storm Harvey? Yes
15. Was there flood insurance for the Property during Tropical Storm Harvey? Yes

Plaintiff(s) Name: Peter and Zhennia Silverman

Attorney Firm Name: Marrs Ellis & Hodge LLP

Plaintiff(s) Signature:  _____

Date: 10-03-2018

*****PROTECTED MATERIAL*****

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE ADDICKS AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIR

THIS DOCUMENT APPLIES TO:

ALL CASES

MASIER DOCKET NO. 17-3000L

AMENDED INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Tim Stahl
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the USACE's operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):
265 Chimney Rock, Houston, Texas 77024.
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs: _____

4. County Property Parcel Identification number¹: 0984930000004

¹ County Property Parcel Identification Numbers are available at [the FBCAD website](#) and [the HCAD website](#).

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*****PROTECTED MATERIAL*****

5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey: On August 27, 2017, Mr. Stahl's property had minimal flooding due to Hurricane Harvey. Mr. Stahl's property was inundated, destroyed, substantially damaged, and/or devalued as a direct result of the Government's intentional release of floodwater from the reservoirs into Buffalo Bayou on or about August 27, 2017 to September 2017. Floodwaters occupied the property from on or about August 27 to August 29, 2017.
6. If known, describe the date and extent of previous Property flooding (if any): None.
7. As of August 24, 2017, was the Property located in: the 100-year floodplain X; the 500-year floodplain X; no known floodplain .
8. When was the Property purchased or leased by you, or do you have some other type of property interest Property was acquired on or about October 26, 2007 with ownership.
9. What is the elevation of the Property according to this website²? 12.8 meters or 42.0 feet
10. Do you have additional information regarding the elevation of the Property (E.G., measurements taken for insurance purposes)? If so, please provide the source and date of the information used to determine the elevation. 47.5' Elevation Certificate dated April 4, 2018.
11. Nature of Property interest (check all that apply): residential X; commercial _____; industrial _____; owner X; renter _____.
12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved):

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php

"PROTECTED MATERIAL"

Improved

13. Is the Property currently listed on MLS for sale? No
14. Has the Property been sold since Tropical Storm Harvey? No
15. Was there flood insurance for the Property during Tropical Storm Harvey? Yes X No

Please contact the undersigned should you have any questions or wish to discuss further.

Very truly yours,

NEFL, HOOPER & BANES, P.C.

By


Bryant S. Banes

Plaintiff(s) Name: Timothy James Stahl

Plaintiff(s) Signature: Timothy James Stahl

Date: 11 APR 26/18

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Stahl000018

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In Re ADDICKS AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIR

Master Docket No. 17-3000L

THIS DOCUMENT APPLIES TO:

ALL CASES

INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Timothy Hawes Stahl
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the USACE's operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):
265 Chimney Rock, Houston, Texas 77024.
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs: _____

4. County Property Parcel Identification number¹: 0984930000004
5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey: On August 27, 2017, Mr. Stahl's property had minimal flooding due to Hurricane Harvey. Mr. Stahl's property was inundated, destroyed, substantially

¹ County Property Parcel Identification Numbers are available at the [FBCAD website](#) and the [HCAD website](#).

damaged, and/or devalued as a direct result of the Government's intentional release of floodwater from the reservoirs into Buffalo Bayou on or about August 27, 2017 to September 2017. Floodwaters occupied the property from on or about August 27 to August 29, 2017.

6. If known, describe the date and extent of previous Property flooding (if any): None.
7. As of August 24, 2017, was the Property located in: the 100-year floodplain X; the 500-year floodplain X; no known floodplain _____.
8. When was the Property purchased or leased by you, or do you have some other type of property interest Property was acquired on or about October 26, 2007 with ownership.
9. What is the elevation of the Property according to this website²? 12.8 meters or 42.0 feet
10. Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes)? If so, please provide the source and date of the information used to determine the elevation. _____
11. Nature of Property interest (check all that apply): residential X; commercial _____; industrial _____; owner X; renter _____.
12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved): Improved
13. Is the Property currently listed on MLS for sale? No
14. Has the Property been sold since Tropical Storm Harvey? No
15. Was there flood insurance for the Property during Tropical Storm Harvey? Yes X No _____

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php

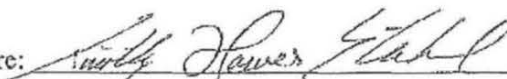
Please contact the undersigned should you have any questions or wish to discuss further.

Very truly yours,

NEEL, HOOPER & BANES, P.C.

By 
Bryant S. Banes

Plaintiff(s) Name: Timothy Hawes Stahl

Plaintiff(s) Signature: 

Date: 5 February 2018

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In Re ADDICKS AND BARKER (TEXAS)

FLOOD-CONTROL RESERVOIR

Master Docket No. 17-3000L

THIS DOCUMENT APPLIES TO:

ALL CASES

INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Tim Stahl
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the USACE's operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):
265 Chimney Rock, Houston, Texas 77024.
3. County Property Parcel Identification number¹: 0984930000004
4. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey: On August 27, 2017, Mr. Stahl's property had minimal flooding due to Hurricane Harvey. Mr. Stahl's property was inundated, destroyed, substantially damaged, and/or devalued as a direct result of the Government's intentional release of floodwater from the reservoirs into Buffalo Bayou on or about August 27, 2017 to September 2017. Floodwaters occupied the property from on or about August 27 to August 29, 2017.

¹ County Property Parcel Identification Numbers are available at the FBCAD website and the HCAD website.

5. If known, describe the date and extent of previous Property flooding (if any): None.
6. As of August 24, 2017, was the Property located in: the 100-year floodplain X; the 500-year floodplain X; no known floodplain _____.
7. When was the Property purchased or leased by you, or do you have some other type of property interest? Property was acquired on or about October 26, 2007 with ownership.
8. What is the elevation of the Property according to this website²? 12.8 meters or 42.0 feet
Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes)? If so, please provide the source and date of the information used to determine the elevation. _____
9. Nature of Property interest (check all that apply): residential X; commercial _____; industrial _____; owner X; renter _____.
10. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved):
Improved
11. Is the Property currently listed on MLS for sale? No
12. Has the Property been sold since Tropical Storm Harvey? No
13. Was there flood insurance for the Property during Tropical Storm Harvey? Yes X No _____

Please contact the undersigned should you have any questions or wish to discuss further.

Very truly yours,

NEEL, HOOPER & BANES, P.C.

By 
Bryant S. Banes

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re **DOWNSTREAM ADDICKS
AND BARKER (TEXAS) FLOOD-
CONTROL RESERVOIRS**

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Sub-Master Docket No. 1:17-9002L

THIS DOCUMENT RELATES TO:

ALL DOWNSTREAM CASES

17-1206 L

INITIAL FACT SHEET

COMPLETE EACH OF THE FOLLOWING. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION, PLEASE AFFIRMATIVELY INDICATE YOU DO NOT KNOW THE ANSWER.

1. Name of Plaintiff(s): Shawn S. Welling
2. Address of Plaintiff(s)' real property that allegedly flooded as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs (hereinafter the "Property"):

5731 Logan Lane, Houston, Texas 77007
3. Location of any other property allegedly taken as a result of the U.S. Army Corps of Engineers' operations of the Addicks and Barker Dams and Reservoirs:

None.
4. County Property Parcel Identification number¹: 1245050010004

¹ County Property Parcel Identification Numbers are available at [the FBCAD website](#) and [the HCAD website](#).

5. If known, describe the date, timing, and extent/amount of Property flooding during Tropical Storm Harvey (i.e. how deep was the water over time, and how much, and what parts, of your property did it cover):

Flooded on or before August 28; as of August 30, property had 2-3 feet of water that Plaintiff pumped out of building; high-water mark was over 10 feet

6. If known, describe the date and extent of previous Property flooding (if any):

None.

7. As of August 24, 2017, was the Property located in: the 100-year floodplain ☒; the 500-year floodplain ☐; no known floodplain ☐.

8. When was the Property purchased or leased by you, or do you have some other type of property interest?

Purchased - 2000

9. What is the elevation of the Property according to this website²?

43.5 feet.

10. Do you have additional information regarding the elevation of the Property (e.g., measurements taken for insurance purposes or a floodplain certificate)? If so, please provide the source and date of the information used to determine the elevation.

No.

11. Nature of Property interest (check all that apply): residential ☐; commercial ☒; industrial ☐; owner ☒; renter ☐.

12. Condition of Property at time of acquisition (i.e. vacant, improved, partially improved):

² Elevation information is available at https://www.mapdevelopers.com/elevation_calculator.php

Improved.

13. Is the Property currently listed on MLS for sale?


No

14. Has the Property been sold since Tropical Storm Harvey? No

15. Was there flood insurance for the Property during Tropical Storm Harvey? No

Plaintiff(s) Name: Shawn S. Welling

Attorney Firm Name: The Potts Law Firm, LLP

Plaintiff(s) Signature:  _____

Date: Feb 26 2018

Richard Long

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IN THE UNITED STATES COURT OF FEDERAL CLAIMS

_____)	
In re DOWNSTREAM ADDICKS AND)	Sub-Master Docket No.
BARKER (TEXAS) FLOOD-CONTROL)	1:17-9002- L
RESERVOIRS)	
_____)	Chief Judge Susan G.
)	Braden
THIS DOCUMENT RELATES TO:)	
)	
ALL DOWNSTREAM CASES)	
_____)	

ORAL AND VIDEOTAPED DEPOSITION OF

RICHARD LONG

AUGUST 7, 2018

ORAL AND VIDEOTAPED DEPOSITION OF RICHARD LONG, produced as a witness at the instance of the Individual Downstream Plaintiffs, and duly sworn, was taken in the above-styled and numbered cause on AUGUST 7, 2018, from 10:09 a.m. to 4:52 p.m., before Aubrea Hobbs, CSR, RPR, in and for the State of Texas, reported by computerized machine shorthand, at the office of McGehee, Chang, Landgraf, 10370 Richmond Avenue, Suite 1300, in the City of Houston, County of Harris, State of Texas, pursuant to Rule 30 of the Rules of the Court of Federal Claims, and the provisions stated on the record or attached hereto.

Richard Long

<p style="text-align: right;">10</p> <p>1 documents that the witness may use to support his or her</p> <p>2 testimony during trial, it's impossible to know which</p> <p>3 documents will support trial testimony at this time.</p> <p>4 The witness has not brought any documents with him</p> <p>5 today.</p> <p>6 And then just one question for counsel,</p> <p>7 there's a Mr. Dunbar in the room. Is Mr. Dunbar an</p> <p>8 attorney and does he represent clients in this matter?</p> <p>9 MR. McGEHEE: Yes.</p> <p>10 MR. DUNBAR: Yes.</p> <p>11 MR. LEVINE: And who are those clients?</p> <p>12 MR. DUNBAR: Ms. Micu.</p> <p>13 MR. LEVINE: Okay. Thank you.</p> <p>14 MR. McGEHEE: Mr. Long, you ready?</p> <p>15 THE WITNESS: Yes, sir.</p> <p>16 DIRECT EXAMINATION</p> <p>17 BY MR. McGEHEE:</p> <p>18 Q. Before we start, it's no secret that we have</p> <p>19 made a 5th Amendment claim against the United States.</p> <p>20 And in the 5th Amendment it uses the word "taken," and</p> <p>21 it uses the word "public use." I'd like to set up the</p> <p>22 question, but the first question I want you to address</p> <p>23 is the greater good that was accomplished by doing what</p> <p>24 you did, and we're here to talk about the release and</p> <p>25 the acts that led up to the release. You're familiar</p>	<p style="text-align: right;">12</p> <p>1 designating this video clip as an exhibit?</p> <p>2 MR. McGEHEE: Haven't yet.</p> <p>3 MR. LEVINE: Okay.</p> <p>4 (Audio clip playing.)</p> <p>5 MR. LONG (via audio clip:) And we know</p> <p>6 it's putting people -- making people hurt upstream and</p> <p>7 we know it's making people hurt downstream, but we have</p> <p>8 to ensure the integrity of the dam and operate the</p> <p>9 reservoirs for the entire population.</p> <p>10 (End of audio clip.)</p> <p>11 Q. (BY MR. McGEHEE) And we have here a blow-up</p> <p>12 of what you just said. Sir, was that you?</p> <p>13 A. Yes, it was.</p> <p>14 Q. Okay. And these are the words that you used?</p> <p>15 A. Yes, sir.</p> <p>16 (Exhibit No. 5 marked.)</p> <p>17 Q. (BY MR. McGEHEE) Okay. And again, I want to</p> <p>18 focus on the public use and the public good that was</p> <p>19 accomplished by what you did, and we have a few more</p> <p>20 clips to play that support that question.</p> <p>21 MR. McGEHEE: So go ahead. Let's do clip</p> <p>22 No. 1.</p> <p>23 THE VIDEOGRAPHER: Hang on.</p> <p>24 (Audio clip playing.)</p> <p>25 MR. LONG (via audio clip:) Unfortunately</p>
<p style="text-align: right;">11</p> <p>1 with what I'm talking about?</p> <p>2 A. Yes, sir.</p> <p>3 Q. And I'd like to play you certain clips of your</p> <p>4 interviews that you gave. My question after each one of</p> <p>5 the clips is going to be is that really you, it is</p> <p>6 really you, and I'm going to ask if you were speaking</p> <p>7 straight, if you want to change anything, but ultimately</p> <p>8 I want you to address the public good. Do you</p> <p>9 understand where we're going?</p> <p>10 A. Yes, sir.</p> <p>11 Q. Okay. Thank you.</p> <p>12 MR. McGEHEE: For the first clip, let's</p> <p>13 play the first clip. It is 3.5.</p> <p>14 (Audio clip playing.)</p> <p>15 THE REPORTER: Could we stop for a</p> <p>16 minute?</p> <p>17 (End of audio clip.)</p> <p>18 THE REPORTER: I wasn't able -- the echo.</p> <p>19 (Technical difficulty.)</p> <p>20 MR. NOLEN: Yeah, we've got too many</p> <p>21 things.</p> <p>22 THE VIDEOGRAPHER: Actually just try to</p> <p>23 mute your speaker.</p> <p>24 MR. CHANG: Okay.</p> <p>25 MR. LEVINE: Just a question. Are you</p>	<p style="text-align: right;">13</p> <p>1 some of our releases are large enough where it's going</p> <p>2 to be in some subdivisions and in some homes.</p> <p>3 Q: Is there any point to know that the</p> <p>4 decisions you have to make even if they are the right</p> <p>5 ones are ones that affect a lot of people?</p> <p>6 A: Oh definitely. I have friends and</p> <p>7 neighbors who are being impacted by these floods.</p> <p>8 (End of audio clip.)</p> <p>9 Q. (BY MR. McGEHEE) Was that you?</p> <p>10 A. Yes, it was.</p> <p>11 Q. Were you speaking straight to everybody?</p> <p>12 THE VIDEOGRAPHER: Hang on. Okay.</p> <p>13 MR. LEVINE: Objection, form, vague.</p> <p>14 Q. (BY MR. McGEHEE) Was that you?</p> <p>15 A. Yes, it was.</p> <p>16 Q. Straight talk?</p> <p>17 MR. LEVINE: Objection, form, vague.</p> <p>18 A. Can you restate the question for me, please?</p> <p>19 Q. (BY MR. McGEHEE) You weren't lying to people,</p> <p>20 were you?</p> <p>21 A. No.</p> <p>22 Q. Okay. These are the words that I've</p> <p>23 highlighted. Those were your words?</p> <p>24 A. Yes.</p> <p>25 Q. Friends and neighbors being impacted?</p>

4 (Pages 10 to 13)

Richard Long

<p style="text-align: right;">18</p> <p>1 A. I do not recall addressing the Ship Channel.</p> <p>2 Q. (BY MR. McGEHEE) We have an article from</p> <p>3 Lars -- what's Lars' last name? Zetter --</p> <p>4 A. Zetterstrom.</p> <p>5 Q. Zetterstrom. I'm sorry. We have an article</p> <p>6 from him where he said the Ship Channel was also</p> <p>7 benefited by the release protocol. Do you agree with</p> <p>8 that?</p> <p>9 MR. LEVINE: Objection, form, lack of</p> <p>10 foundation.</p> <p>11 A. That would be his determination to make that.</p> <p>12 Q. (BY MR. McGEHEE) Do you agree with it?</p> <p>13 A. It's not mine to agree or disagree with him.</p> <p>14 Q. I'm asking you to agree or disagree. Do you</p> <p>15 agree that the Ship Channel was part of the City of</p> <p>16 Houston that involves the public use?</p> <p>17 MR. LEVINE: Objection, form, compound</p> <p>18 question.</p> <p>19 A. The -- the Ship Channel is within the City of</p> <p>20 Houston, yes.</p> <p>21 Q. (BY MR. McGEHEE) And that's part of the</p> <p>22 reason why the protocol exists for the release of water?</p> <p>23 A. I do not --</p> <p>24 MR. LEVINE: Objection, form, lack of</p> <p>25 foundation.</p>	<p style="text-align: right;">20</p> <p>1 A. No, sir, I do not know those people.</p> <p>2 Q. (BY MR. McGEHEE) Did you ever see this house</p> <p>3 after the flooding?</p> <p>4 A. Yes, sir, I did.</p> <p>5 Q. Okay. And I'll represent to you one of the</p> <p>6 people whose names on that list was the owner of this</p> <p>7 house. Tell the judge what you know about the owner of</p> <p>8 that house.</p> <p>9 MR. LEVINE: Objection, form, vague, lack</p> <p>10 of foundation.</p> <p>11 MR. McGEHEE: That's a speaking</p> <p>12 objection.</p> <p>13 MR. LEVINE: And is that picture that you</p> <p>14 just put up going to be designated as an exhibit?</p> <p>15 Q. (BY MR. McGEHEE) You can answer the question.</p> <p>16 A. That home is one that was impacted by flooding</p> <p>17 as a result of Harvey.</p> <p>18 (Exhibit No. 3 marked.)</p> <p>19 Q. (BY MR. McGEHEE) Yeah. And -- and actually</p> <p>20 both these people died in the -- after the release,</p> <p>21 didn't they?</p> <p>22 A. I do not know that.</p> <p>23 Q. What would you say to the estates of these</p> <p>24 folks and to everybody listening about the public good</p> <p>25 that was accomplished by having the release protocol by</p>
<p style="text-align: right;">19</p> <p>1 A. I do not know that for sure.</p> <p>2 Q. (BY MR. McGEHEE) I want to now get to my big</p> <p>3 question and my big question is going to be put this in</p> <p>4 context, put the public use in context. Tell the</p> <p>5 judge -- and by the way, we have maybe 200 or so</p> <p>6 homeowners watching this as we speak.</p> <p>7 A. Yes, sir.</p> <p>8 Q. So we may have the families of these two folks</p> <p>9 up here. Tell the families and tell the homeowners what</p> <p>10 greater good was accomplished by following the protocol</p> <p>11 that involved releasing the dams. First of all, do you</p> <p>12 know those two folks?</p> <p>13 MR. LEVINE: Objection, form. Compound</p> <p>14 question, vague, mischaracterizes prior testimony, lack</p> <p>15 of foundation.</p> <p>16 MR. McGEHEE: That's a speaking</p> <p>17 objection.</p> <p>18 Q. (BY MR. McGEHEE) Go ahead and answer the</p> <p>19 question.</p> <p>20 A. Can you ask me a straight question and not --</p> <p>21 restraight -- restate your question, please, sir.</p> <p>22 Q. Do you know those people?</p> <p>23 A. Those people?</p> <p>24 Q. That wasn't a straight question?</p> <p>25 (Exhibit No. 2 marked.)</p>	<p style="text-align: right;">21</p> <p>1 the Corps of Engineers?</p> <p>2 MR. LEVINE: Objection, form, lack of</p> <p>3 foundation.</p> <p>4 A. The -- the operation of the projects were</p> <p>5 designated for the overall good of the City of Houston.</p> <p>6 Q. (BY MR. McGEHEE) Why?</p> <p>7 A. To provide flood risk management to the City</p> <p>8 of Houston.</p> <p>9 Q. How would it help the City of Houston?</p> <p>10 A. It would prevent -- it would help limit the</p> <p>11 impacts of flooding that may occur from a storm event.</p> <p>12 Q. And in order to do that, you write protocols?</p> <p>13 A. There are protocols, yes, sir.</p> <p>14 Q. Lots of rules and regulations on how to do</p> <p>15 that?</p> <p>16 A. Yes, sir.</p> <p>17 Q. And before we get started, you followed all</p> <p>18 those rules and regulations, didn't you?</p> <p>19 MR. LEVINE: Objection, form, lack of</p> <p>20 foundation.</p> <p>21 A. I was part of the team that was involved in</p> <p>22 the decision-making process, but it was not my decision.</p> <p>23 Q. (BY MR. McGEHEE) And I'm asking you that</p> <p>24 y'all followed those rules and protocols, didn't you?</p> <p>25 A. It's my understanding that we did, yes.</p>

6 (Pages 18 to 21)

Richard Long

<p style="text-align: right;">22</p> <p>1 Q. It's my understanding too. Let's talk about 2 those. Let's talk about the acts. And before we talk 3 about the acts, if you could move your chair just a 4 little bit, I want to show the judge exactly what we're 5 talking about. This looks familiar to you, doesn't it? 6 (Exhibit No. 1 marked.) 7 MR. LEVINE: Objection, form, lack of 8 foundation. Is that an exhibit in this deposition? 9 Q. (BY MR. McGEHEE) Go ahead, sir. 10 A. Yes, sir. 11 Q. Okay. And these are the reservoirs? 12 A. Yes, sir. 13 Q. This is the Buffalo Bayou? 14 A. Yes, sir. 15 Q. And I'll represent to you that there are 13 16 dots on here, and I'll represent to you that they 17 reflect the 13 test property owners that have been 18 identified in the consolidated complaint. Will you spot 19 me that? 20 A. Would you ask that question again? 21 Q. Yeah. I'll represent to you that these 13 22 dots represent the test property owners involved in this 23 case. 24 A. Okay. 25 Q. And -- and if you could bear with me one more</p>	<p style="text-align: right;">24</p> <p>1 Q. Okay. 2 A. And on Barker Dam south of I-10 by 3 approximately one mile and on the west side of Highway 4 6. 5 Q. So that -- where it says outlet here, that -- 6 that's where the release gates are? 7 A. That's where the control structures are, yes, 8 sir. 9 Q. Okay. I'd like to talk now about the acts. 10 And the acts -- I'm going to list them for you and I'm 11 going to ask you to explain them. The first act is 12 opening -- I'm sorry, closing the gates. 13 MR. LEVINE: Do you mind sitting down? 14 Thank you. 15 Q. (BY MR. McGEHEE) At some point during 16 Hurricane Harvey, y'all closed the gates? 17 A. Yes, sir. 18 Q. And you did that because that's what the 19 manual said to do? 20 A. Yes, sir. 21 Q. What manual? 22 A. Our Water Control Manual. 23 Q. Can I abbreviate that WCM and you understand 24 what I'm talking about? 25 A. Yes, sir.</p>
<p style="text-align: right;">23</p> <p>1 time, when I talk about inundation area -- this is Jack 2 McGehee talking. When I talk about inundation area, I'm 3 talking about the release water that -- that flooded the 4 test properties after the release was conducted. When I 5 talk about inundation area, this is what I'm talking 6 about. Do you understand what I'm saying? 7 MR. LEVINE: Objection, form, vague. 8 A. Yes, sir. 9 Q. (BY MR. McGEHEE) Do you -- okay. We have 10 here end of dam, end of dam. Is that accurate? 11 A. Yes, sir. 12 Q. Okay. And then down here end of dam and up 13 here end of dam; is that accurate? 14 A. Yes, sir. 15 Q. Okay. Now, there's two outlets here. Can you 16 tell the judge where the release outlets occur and if 17 they're in these places marked outlet or if there's 18 other places where there is a release outlet where water 19 flowed during the -- during the surge? 20 MR. LEVINE: Objection, form, compound 21 question. 22 Q. (BY MR. McGEHEE) Where are the release gates? 23 A. The release gates are at the locations that's 24 indicated on the map on Addicks Dam between Eldridge 25 road and Highway 6 north of I-10.</p>	<p style="text-align: right;">25</p> <p>1 Q. Who was responsible for closing the gates? 2 A. A member of the operational team for Addicks 3 and Barker. 4 Q. Under you? 5 A. No, sir. 6 Q. Do you know who it was? 7 A. Yes, sir, I do. 8 Q. Okay. Can you tell me who it was? 9 A. David McIntosh. 10 Q. Okay. And he was -- he was part of -- part of 11 your team? 12 A. He was part of the operational team, yes, sir. 13 Q. When was that performed? 14 MR. LEVINE: Objection, form, vague, lack 15 of foundation. 16 Q. (BY MR. McGEHEE) Go ahead. He's just talking 17 in the record. He's not talking to you. 18 A. It was approximately a time period when Harvey 19 made landfall or immediately thereafter. 20 Q. The 25th? 21 A. I don't know the actual date. I don't recall 22 the actual date. 23 Q. Before the 26th, how's that? 24 A. Yes. 25 Q. Okay.</p>

7 (Pages 22 to 25)

Richard Long

<p style="text-align: right;">30</p> <p>1 MR. LEVINE: Objection, form, vague. Is</p> <p>2 that a question, Counsel?</p> <p>3 A. There was an intentional release of water down</p> <p>4 Buffalo Bayou, yes.</p> <p>5 Q. (BY MR. McGEHEE) By the book?</p> <p>6 MR. LEVINE: Objection, form, vague.</p> <p>7 A. By the book.</p> <p>8 Q. (BY MR. McGEHEE) And that book is the same</p> <p>9 book that closed the gates?</p> <p>10 MR. LEVINE: Objection, form, vague.</p> <p>11 A. Yes.</p> <p>12 Q. (BY MR. McGEHEE) Who performed it?</p> <p>13 A. Who performed what?</p> <p>14 Q. The induced surcharge.</p> <p>15 A. Define performed.</p> <p>16 Q. Please, Mr. Long, you define performed.</p> <p>17 MR. LEVINE: Objection, harassment.</p> <p>18 A. No, sir. When you say who performed it, do</p> <p>19 you mean who physically performed the gate changes?</p> <p>20 Q. (BY MR. McGEHEE) Yes, sir.</p> <p>21 A. Part of the operational team.</p> <p>22 Q. When?</p> <p>23 A. I don't know the actual date that it occurred.</p> <p>24 Sometime around the post Harvey landfall.</p> <p>25 Q. So sometime after the 26th?</p>	<p style="text-align: right;">32</p> <p>1 Q. (BY MR. McGEHEE) And you knew that before the</p> <p>2 gates were opened?</p> <p>3 A. Yes.</p> <p>4 Q. That was your protocol since 1964?</p> <p>5 MR. LEVINE: Objection, form, vague.</p> <p>6 A. That's the Corps' protocol.</p> <p>7 Q. (BY MR. McGEHEE) Okay. Were there any other</p> <p>8 acts involving the induced surcharge besides closing and</p> <p>9 opening the gates?</p> <p>10 A. Any other acts?</p> <p>11 Q. Yeah. Were there any deviations?</p> <p>12 MR. LEVINE: Objection, form, lack of</p> <p>13 foundation.</p> <p>14 A. Can you give me the time period when you're</p> <p>15 referring to deviations?</p> <p>16 Q. (BY MR. McGEHEE) Yeah, sure. After the early</p> <p>17 morning hours of the 28th, after that were there any</p> <p>18 deviations?</p> <p>19 A. Not that I'm aware of.</p> <p>20 Q. These -- had these gates not been closed and</p> <p>21 had they not been open, that would have been a violation</p> <p>22 of your protocol; true?</p> <p>23 MR. LEVINE: Objection, form, lack of</p> <p>24 foundation.</p> <p>25 A. That would have been contrary to the Water</p>
<p style="text-align: right;">31</p> <p>1 A. Yes.</p> <p>2 Q. And you -- sitting here right now, what's your</p> <p>3 best estimate as to when the gates were opened?</p> <p>4 MR. LEVINE: Objection, form, vague.</p> <p>5 A. Without my -- without records, I do not know.</p> <p>6 Q. (BY MR. McGEHEE) What you've told everybody</p> <p>7 many times in talks, that they were opened in the early</p> <p>8 morning hours of the 28th.</p> <p>9 A. Okay.</p> <p>10 Q. Do -- did you lie when you said that?</p> <p>11 A. No, sir.</p> <p>12 Q. Okay. The manual authorized the opening of</p> <p>13 the gates; true?</p> <p>14 A. Yes.</p> <p>15 Q. In fact, the manual required the opening of</p> <p>16 the gates?</p> <p>17 MR. LEVINE: Objection, form, vague.</p> <p>18 A. Yes.</p> <p>19 Q. (BY MR. McGEHEE) And when you opened the</p> <p>20 gates based on the things we discussed before, you knew</p> <p>21 that there were going to be downstream properties</p> <p>22 flooded?</p> <p>23 MR. LEVINE: Objection, form, vague.</p> <p>24 A. When the gates were open it would result in</p> <p>25 additional flows going downstream, yes.</p>	<p style="text-align: right;">33</p> <p>1 Control Manual.</p> <p>2 Q. (BY MR. McGEHEE) And -- and if you didn't</p> <p>3 open the gates when they were opened, if you didn't and</p> <p>4 somebody decided not to do it, that would be a violation</p> <p>5 of the regulation?</p> <p>6 MR. LEVINE: Objection, form.</p> <p>7 Q. (BY MR. McGEHEE) True?</p> <p>8 MR. LEVINE: Compound question,</p> <p>9 objection, form, compound question.</p> <p>10 A. The Water Control Manual is not a regulation.</p> <p>11 It's a guidance document.</p> <p>12 Q. (BY MR. McGEHEE) Okay. It would be in</p> <p>13 violation of the guidance document?</p> <p>14 A. It would be contrary to the guidance document,</p> <p>15 yes.</p> <p>16 Q. Okay. And -- and that's the guidance document</p> <p>17 that's been around since 1964?</p> <p>18 MR. LEVINE: Objection, form, vague.</p> <p>19 A. This document here is dated 2012.</p> <p>20 Q. (BY MR. McGEHEE) Okay. Well, then it's been</p> <p>21 around at least since 2012, remember that?</p> <p>22 MR. LEVINE: Let the record reflect that</p> <p>23 the witness was looking at the document called Water</p> <p>24 Control Manual.</p> <p>25 MR. McGEHEE: And why would you say that,</p>

9 (Pages 30 to 33)

Richard Long

<p style="text-align: right;">34</p> <p>1 Counsel?</p> <p>2 MR. LEVINE: November of 2012.</p> <p>3 MR. McGEHEE: Except to instruct, why</p> <p>4 would you say that?</p> <p>5 MR. LEVINE: You haven't designated it as</p> <p>6 an exhibit. The witness was looking at it and I was</p> <p>7 stating it for the record.</p> <p>8 MR. McGEHEE: This is your third warning.</p> <p>9 No speaking objections. And we're going to talk to the</p> <p>10 judge in an hour or so, so we will bring it up with the</p> <p>11 judge if you violate that again.</p> <p>12 MR. LEVINE: Counsel, if you'd like to go</p> <p>13 off record and have a discussion, I'm happy to do that.</p> <p>14 Q. (BY MR. McGEHEE) Affirmative acts.</p> <p>15 Affirmative acts. These acts, these two acts, if Harvey</p> <p>16 hit again, these two acts would be performed again,</p> <p>17 wouldn't they?</p> <p>18 MR. LEVINE: Objection, form, vague.</p> <p>19 A. If conditions were exactly the same.</p> <p>20 Q. (BY MR. McGEHEE) Sure. And you expect</p> <p>21 sometime that the conditions will be exactly the same,</p> <p>22 and that these two acts will need to be repeated in the</p> <p>23 future?</p> <p>24 MR. LEVINE: Objection, form, compound</p> <p>25 question.</p>	<p style="text-align: right;">36</p> <p>1 floods but we cannot stop a flood.</p> <p>2 (End of audio clip.)</p> <p>3 Q. (BY MR. McGEHEE) Was that --</p> <p>4 THE VIDEOGRAPHER: Hang on. Hang on.</p> <p>5 Give me a second. Go ahead.</p> <p>6 MR. LEVINE: Counsel, have you designated</p> <p>7 that as an exhibit?</p> <p>8 Q. (BY MR. McGEHEE) Was that --</p> <p>9 MR. McGEHEE: I'm not talking to you,</p> <p>10 Counsel.</p> <p>11 Q. (BY MR. McGEHEE) Was that you?</p> <p>12 A. Yes.</p> <p>13 Q. Is that what you said?</p> <p>14 A. That appears to be what I said.</p> <p>15 (Exhibit No. 8 marked.)</p> <p>16 Q. (BY MR. McGEHEE) Okay. And you also used</p> <p>17 Mother Nature. Is -- would you consider Mother</p> <p>18 Nature -- Nature's act an act of God?</p> <p>19 A. Yes.</p> <p>20 Q. So Hurricane Harvey could be classified as an</p> <p>21 act of God if you will?</p> <p>22 MR. LEVINE: Objection, form, vague.</p> <p>23 A. Yes.</p> <p>24 Q. (BY MR. McGEHEE) Tax day flood?</p> <p>25 A. Yes.</p>
<p style="text-align: right;">35</p> <p>1 Q. (BY MR. McGEHEE) Fair?</p> <p>2 A. The Corps is prepared for other similar</p> <p>3 events.</p> <p>4 Q. So these could be in -- inevitably recurring</p> <p>5 acts; agreed?</p> <p>6 A. Yes.</p> <p>7 Q. These acts that we've written, No. 1 and 2,</p> <p>8 they are not acts of God, are they?</p> <p>9 A. The action of opening and closing the gates</p> <p>10 were not acts of God.</p> <p>11 Q. Okay. What do you consider acts of God?</p> <p>12 A. Generally, weather or geological events.</p> <p>13 Q. Okay. I'm going to play another clip. I'm</p> <p>14 going to ask if that's you and -- and if you spoke</p> <p>15 straight.</p> <p>16 MR. McGEHEE: Go ahead and play clip</p> <p>17 No. 6.</p> <p>18 THE VIDEOGRAPHER: Hang on. Go ahead.</p> <p>19 (Audio clip playing.)</p> <p>20 MR. LONG (via audio clip:) The water is</p> <p>21 big, the water is mean and we do not have control over</p> <p>22 Mother Nature. The Corps of Engineers realized a few</p> <p>23 years back that we are no longer in the flood control</p> <p>24 business. We are in flood risk management business,</p> <p>25 meaning that we can actually help reduce the impacts of</p>	<p style="text-align: right;">37</p> <p>1 MR. LEVINE: Objection.</p> <p>2 Q. (BY MR. McGEHEE) Tax day?</p> <p>3 MR. LEVINE: Objection, form, vague.</p> <p>4 A. Yes.</p> <p>5 Q. (BY MR. McGEHEE) Memorial Day flood?</p> <p>6 MR. LEVINE: Objection, form, vague.</p> <p>7 A. Yes.</p> <p>8 Q. (BY MR. McGEHEE) Allison?</p> <p>9 A. Yes.</p> <p>10 Q. It may rain today. Would that be an act of</p> <p>11 God in your opinion?</p> <p>12 A. Yes.</p> <p>13 Q. It's your job, it's the job of the Corps of</p> <p>14 Engineers to protect the City of Houston as best they</p> <p>15 can from acts of God?</p> <p>16 MR. LEVINE: Objection.</p> <p>17 Q. (BY MR. McGEHEE) True?</p> <p>18 MR. LEVINE: Objection, form, compound</p> <p>19 question.</p> <p>20 A. Would you restate your question, please?</p> <p>21 Q. (BY MR. McGEHEE) Sure, sure. It's the job of</p> <p>22 the Corps of Engineers, to your knowledge, to protect</p> <p>23 the City of Houston from acts of God?</p> <p>24 A. I would not say that's a fair paraphrasing of</p> <p>25 what our role is.</p>

10 (Pages 34 to 37)

Richard Long

<p style="text-align: right;">38</p> <p>1 Q. What would you say?</p> <p>2 A. We have been directed by Congress to take</p> <p>3 actions that will reduce the impact to the best --</p> <p>4 within the guides provided to us of a flood event in the</p> <p>5 City of Houston.</p> <p>6 Q. So your mission, according to the Act of</p> <p>7 Congress, is to reduce the impact of acts of God; fair?</p> <p>8 A. Where -- where it's within the guidance</p> <p>9 provided to us and where it's possible to do that.</p> <p>10 Q. With that caveat; fair?</p> <p>11 A. Yes.</p> <p>12 Q. These acts were not pursuant to an emergency</p> <p>13 as defined by the Corps of Engineers?</p> <p>14 MR. LEVINE: Objection, form, vague, lack</p> <p>15 of foundation.</p> <p>16 Q. (BY MR. McGEHEE) True?</p> <p>17 A. I didn't -- I do not know.</p> <p>18 Q. You know what the Emergency Action Plan is?</p> <p>19 A. Yes.</p> <p>20 Q. You know it's -- you've got to follow the</p> <p>21 Emergency Action Plan to the T, correct?</p> <p>22 A. You need to follow the Emergency Action Plan,</p> <p>23 yes.</p> <p>24 Q. At no time during Hurricane Harvey was</p> <p>25 Hurricane Harvey declared an emergency by the Corps of</p>	<p style="text-align: right;">40</p> <p>1 MR. LEVINE: Objection, form, compound</p> <p>2 question.</p> <p>3 Q. (BY MR. McGEHEE) You know that's the</p> <p>4 definition of oxymoron?</p> <p>5 A. Yes, sir.</p> <p>6 Q. Nowhere in the Emergency Action Plan are the</p> <p>7 words "informal emergency" used, correct?</p> <p>8 MR. LEVINE: Objection, form, lack of</p> <p>9 foundation.</p> <p>10 A. I do not know the document word for word so I</p> <p>11 couldn't say if it's in there or not.</p> <p>12 Q. (BY MR. McGEHEE) You know that it's not</p> <p>13 protocol to have informal emergency action plans,</p> <p>14 correct?</p> <p>15 MR. LEVINE: Objection, form, lack of</p> <p>16 foundation.</p> <p>17 A. Yes, sir.</p> <p>18 Q. (BY MR. McGEHEE) And I'll -- and I'll be</p> <p>19 straight with you, Mr. Long. I think the word "informal</p> <p>20 emergency" came up in preparation for this lawsuit, so</p> <p>21 my question is this: Have you ever seen those words</p> <p>22 written in any document ever in the history of the</p> <p>23 world, ever, published by the Corps of Engineers, have</p> <p>24 you ever seen the words "informal emergency"?</p> <p>25 MR. LEVINE: Objection, form, compound</p>
<p style="text-align: right;">39</p> <p>1 Engineers; true?</p> <p>2 A. Could you restate that question, please?</p> <p>3 Q. At no time did you designate this as an</p> <p>4 emergency?</p> <p>5 MR. LEVINE: Objection, form, calls for</p> <p>6 speculation.</p> <p>7 A. At no time to my knowledge did conditions</p> <p>8 exist that would require us to exercise the emergency</p> <p>9 operation plan.</p> <p>10 Q. (BY MR. McGEHEE) And since the conditions</p> <p>11 didn't exist, you didn't declare an emergency, did you?</p> <p>12 MR. LEVINE: Objection, form, calls for</p> <p>13 speculation.</p> <p>14 A. Not to my knowledge.</p> <p>15 Q. (BY MR. McGEHEE) And there's a -- I'm going</p> <p>16 to hand you that. That's the Corps of Engineers</p> <p>17 Emergency Action Plan, isn't it?</p> <p>18 A. Yes, sir.</p> <p>19 Q. And that's what you're referring to as never</p> <p>20 being invoked in Harvey?</p> <p>21 A. Yes, sir.</p> <p>22 Q. Okay. I heard the word "informal emergency,"</p> <p>23 and I almost laughed because it sounds to me like an</p> <p>24 oxymoron. Do you know an oxymoron is when two words</p> <p>25 seem to contradict each other?</p>	<p style="text-align: right;">41</p> <p>1 question.</p> <p>2 A. Not that I recall.</p> <p>3 (Exhibit No. 9 marked.)</p> <p>4 Q. (BY MR. McGEHEE) You've done -- the Corps has</p> <p>5 done modeling before Harvey and after Harvey to</p> <p>6 determine inundation outcomes; is that a fair statement?</p> <p>7 MR. LEVINE: Objection, form, compound</p> <p>8 question.</p> <p>9 A. Yes, sir.</p> <p>10 Q. (BY MR. McGEHEE) I wanna talk about the</p> <p>11 modeling input and compare that with some other things.</p> <p>12 Let -- come with me up here, if you would, bring your</p> <p>13 attention up here. Do you know whether the Corps</p> <p>14 modeling includes these test properties being inundated</p> <p>15 after the surcharge, after the induced surcharge, do you</p> <p>16 know?</p> <p>17 MR. LEVINE: Objection, form, calls for</p> <p>18 speculation.</p> <p>19 A. I'm not an expert on the modeling.</p> <p>20 Q. (BY MR. McGEHEE) And I didn't ask if you're</p> <p>21 an expert. Do you know if these areas here have been</p> <p>22 modeled by the Corps?</p> <p>23 A. In general those areas have been modeled by</p> <p>24 the Corps.</p> <p>25 Q. I want to ask you what would be more credible.</p>

11 (Pages 38 to 41)

Richard Long

<p style="text-align: right;">198</p> <p>1 Q. Right. "For his public meeting early next 2 week, and he will be back in the office tomorrow." 3 So what we're trying to do here, I think, is 4 prepare Colonel Owen for a meeting, right? 5 A. Yes. 6 Q. Okay. And so the ant -- these are anticipated 7 questions, correct? 8 A. Yes. 9 Q. All right. That's your understanding? 10 A. Yes. 11 Q. All right. So we'll mark -- because the next 12 document that we'll mark is No. 28, we'll mark 28 which 13 is the questions with the answers put in. 14 (Exhibit No. 28 marked.) 15 Q. (BY MR. NOLEN) And so if we look at the 16 top -- and I'll give you a second to look at it. 17 September 28th, 2017, Draft Q&A's Addicks and Barker 18 Reservoirs. 19 Do you see that, sir? 20 A. Yes. 21 MR. LEVINE: I'm sorry, can he -- can he 22 have a moment to review? 23 MR. NOLEN: Yes, he can. 24 Q. (BY MR. NOLEN) I just want to ask him: Have 25 you seen this document before?</p>	<p style="text-align: right;">200</p> <p>1 that the goal of delaying the flow of water along the 2 watershed which makes downstream flows more consistent 3 and less damaging, was achieved with the induced 4 surcharge releases on the 27th and 28th and thereafter 5 from the two reservoirs? 6 MR. LEVINE: Objection, form, compound 7 question. 8 A. Can you restate the question for me, please? 9 Q. (BY MR. NOLEN) Yes, sir. Do you believe that 10 the Corps achieved its goal of -- its asserted goal here 11 of delaying the flow of water along the watershed which 12 makes downstream flows more consistent and less 13 damaging? 14 A. Yes. 15 Q. All right. And so you believe that the -- the 16 induced surcharge that occurred on the 27th and then 17 extended for more than a week lessened the amount of 18 flow downstream and made it less damaging? 19 A. Yes. 20 Q. And -- and what basis do you have for saying 21 that? 22 A. That was based on the amount of inflows that 23 was reported to me that were occurring into Addicks and 24 Barker reservoir. 25 Q. Okay. But they -- the Corps did have the</p>
<p style="text-align: right;">199</p> <p>1 A. I can't say specifically I have. 2 Q. Okay. Well, take a look at it and I'll ask 3 you some questions about it. 4 A. (Witness examines document.) Okay. 5 Q. All right, sir. Now, the -- we've 6 established, I think, that Exhibit 28 is the Q&A's that 7 were supposed to help Colonel Owen. Did you have any 8 input in the drafting of these Q&A's? 9 A. I don't specifically recall. 10 Q. Do you know who did draft these Q&A's? 11 A. Not specifically, no. 12 Q. All right. Well, let's look at one Q, okay, 13 that's the first question. "Why did the Corps flood my 14 home?" 15 The suggested answer or the answer in this Q&A 16 is: "In accordance with our flood control authorities, 17 USACE operations are designed to lessen the effects of 18 downstream flooding by delaying the flow of water along 19 the watershed which makes downstream flows more 20 consistent and less damaging. The cause of the flooding 21 was the unprecedented rainfall associated with Hurricane 22 Harvey." 23 Do you see that? 24 A. Yes, sir. 25 Q. All right. Now, do you believe that the --</p>	<p style="text-align: right;">201</p> <p>1 option of not opening the gates, right? 2 MR. LEVINE: Objection, form, calls for 3 speculation. 4 A. The manual guided us on how to operate at that 5 time. 6 Q. (BY MR. NOLEN) I understand, but -- but 7 you're not required to follow the manual, correct? 8 MR. LEVINE: Objection, form, calls for 9 speculation. 10 A. The -- the -- the manual is to be used by our 11 dam safety officer to determine what actions to take. 12 Q. (BY MR. NOLEN) And -- 13 A. That's not my call. 14 Q. Okay. Now, are you -- you're aware that there 15 was at no point during the Harvey event, that the -- 16 either of the reservoirs were in danger of failure, 17 correct? 18 A. Correct. 19 Q. Right. And so Mr. Thomas or colonel -- starts 20 with a Z. 21 A. Colonel Zetterstrom. 22 Q. Zetterstrom. I'm sorry. I blanked on that. 23 Either Mr. Thomas or Colonel Zetterstrom could have 24 overrode the manual, couldn't they? 25 MR. LEVINE: Objection, form, calls for</p>

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Richard Long

<p style="text-align: right;">202</p> <p>1 speculation.</p> <p>2 A. I do not know.</p> <p>3 Q. (BY MR. NOLEN) Are you aware of any time</p> <p>4 during your 41-year career when the manual was</p> <p>5 disregarded or was overridden?</p> <p>6 A. To my knowledge it's never been disregarded.</p> <p>7 Q. Has it ever been overridden?</p> <p>8 A. Not to my knowledge.</p> <p>9 Q. You can have variations, deviations from the</p> <p>10 manual though, can't you?</p> <p>11 A. Yes.</p> <p>12 Q. All right. And one deviation could have been</p> <p>13 we're not gonna open the gates, right?</p> <p>14 MR. LEVINE: Objection, form, calls for</p> <p>15 speculation.</p> <p>16 A. I -- that wouldn't be my decision or call on</p> <p>17 that.</p> <p>18 Q. (BY MR. NOLEN) Okay. Now if we go down to</p> <p>19 5Q, it says: "Why did you choose to flood my</p> <p>20 neighborhood and protect others?"</p> <p>21 And the statement here is: "USACE does not</p> <p>22 'intend' to flood anyone. USACE operates its projects</p> <p>23 in a manner deliberately and carefully designed to</p> <p>24 preserve the structure and protect life and property."</p> <p>25 Do you see that, sir?</p>	<p style="text-align: right;">204</p> <p>1 testimony, asked and answered.</p> <p>2 A. The property flooded as a result of its</p> <p>3 location, not an intent by the Corps.</p> <p>4 Q. (BY MR. NOLEN) Right, but it's foreseeable.</p> <p>5 I mean, you know that when you open it, it's going to</p> <p>6 flood that property, right?</p> <p>7 MR. LEVINE: Objection, form, vague.</p> <p>8 A. Could you restate the question, please?</p> <p>9 Q. (BY MR. NOLEN) When you open the gates, if</p> <p>10 you have certain areas that have been identified as</p> <p>11 flooding at a certain rate of flow, then you know when</p> <p>12 you open them, when you open the gates, you know those</p> <p>13 properties will flood?</p> <p>14 MR. LEVINE: Objection, form, calls for</p> <p>15 speculation.</p> <p>16 A. Yes.</p> <p>17 Q. (BY MR. NOLEN) Now, the next question that I</p> <p>18 want to ask you about is question 9Q. It says: "Can</p> <p>19 the Corps of Engineers flood homes downstream if they</p> <p>20 need to?"</p> <p>21 Then it has an answer: "USACE does not intend</p> <p>22 to flood anyone. USACE operates its projects in a</p> <p>23 manner deliberately and carefully designed to preserve</p> <p>24 the structure and protect life and property."</p> <p>25 Do you see that?</p>
<p style="text-align: right;">203</p> <p>1 A. Yes.</p> <p>2 Q. Now, is this an accurate statement that USACE</p> <p>3 does not intend to flood anyone? Is that a accurate</p> <p>4 statement in your view?</p> <p>5 A. Yes.</p> <p>6 Q. Well, when -- when the Addicks and Barker go</p> <p>7 into induced surcharge and there is an intentional</p> <p>8 release from the reservoirs, and you know that there</p> <p>9 will be flooding downstream, isn't that intentional</p> <p>10 flooding by the Army Corps of Engineers?</p> <p>11 MR. LEVINE: Objection, form, compound</p> <p>12 question.</p> <p>13 A. I think we are playing with definitions here.</p> <p>14 The Corps never intends to flood anyone. However,</p> <p>15 conditions may result in that activity.</p> <p>16 Q. (BY MR. NOLEN) Right. And I'm not suggesting</p> <p>17 harm. I'm not suggesting that some intent to harm or</p> <p>18 malice, none of that. What I'm really asking, though,</p> <p>19 is, is when the gates are open, if you know there'll be</p> <p>20 certain properties flooded and that's an induced</p> <p>21 surcharge, you said induced was -- was intentional, and</p> <p>22 surcharge is a release of water, you're intentionally</p> <p>23 flooding some properties, right?</p> <p>24 MR. LEVINE: Objection -- objection,</p> <p>25 form, compound question, mischaracterizes prior</p>	<p style="text-align: right;">205</p> <p>1 A. Yes.</p> <p>2 Q. Okay. Now, just to answer the question "Can</p> <p>3 the Corps of Engineers flood homes downstream if they</p> <p>4 need to," the answer is yes, right?</p> <p>5 MR. LEVINE: Objection, form, calls for</p> <p>6 speculation.</p> <p>7 Q. (BY MR. NOLEN) Right?</p> <p>8 A. Can you re -- reask the question?</p> <p>9 Q. Well, the question -- the suggested answer</p> <p>10 doesn't answer the question, and so if you -- look at</p> <p>11 the question. "Can the Corps of Engineers flood homes</p> <p>12 downstream if they need to?"</p> <p>13 That's a yes or no.</p> <p>14 And so the answer is: "USACE does not intend</p> <p>15 to flood anyone. USACE operates its projects in a</p> <p>16 manner deliberately and carefully designed to preserve</p> <p>17 the structure" -- which is the reservoirs, right -- and</p> <p>18 to "protect life and property."</p> <p>19 Okay? But -- but just a yes or no answer to</p> <p>20 this is "Can the Corps of Engineers flood homes</p> <p>21 downstream if they need to," the answer is yes, right?</p> <p>22 MR. LEVINE: Objection, form, compound</p> <p>23 question, calls for speculation.</p> <p>24 A. Property can be inundated as a result of the</p> <p>25 action of the Corps.</p>

52 (Pages 202 to 205)



REPLY TO
ATTENTION OF
CESWG-EC-DL

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P.O BOX 1229
GALVESTON, TEXAS 77553-1229

27 October 2017

MEMORANDUM FOR Commander, Southwestern Division, (CESWD-RBT, Michael Southern)

SUBJECT: Addicks and Barker Dams, Houston, Texas, New Pool of Record

- 1 Addicks and Barker Dams both set a new pool of record on 30 August 2017 of 109.09 feet (NAVD88) and 101.56 feet (NAVD88) respectively. This was due to Hurricane Harvey stalling over the Addicks and Barker reservoir watershed producing 32-35 inches of rain from 25 – 29 August 2017. Galveston District engineers were on site monitoring around the clock under the Stage 2 Extended Watch alert in accordance with the Addicks and Barker Dams' Emergency Action Plan (EAP). Visual observations, photographic evidence, and instrumentation readings were recorded. The enclosed report documents the project's performance for the new pool of record in accordance with the requirements of ER 1110-2-1156, Safety of Dams, Policy and Procedures, 31 March 2014.
- 2 The embankment, outlet structures, and emergency spillways functioned as intended. Piezometers, settlement pins, and alignment surveys for the outlet structures do not shown any alarming trends from this pool of record. There were no observations of seepage, or critical distress areas located on the dams. Wet areas located on the downstream embankment toe were monitored, but showed no signs of flow. Erosion of the dam and cofferdam crest became an issue for inspection teams trying to transverse them. Overall conclusion is that the project was performing as expected with no significant problems during this pool of record event.

Encl
1. Report of Performance

Robert C. Thomas, P.E.
Chief, Engineering and Construction Division
Galveston District Dam and Levee Safety Officer

Digitally signed by
THOMAS, ROBERT, CHARLES, IL1052686924
DN: cn=US, ou=U.S. Government, ou=DOD, ou=PR,
ou=USA,
cn=THOMAS, ROBERT, CHARLES, IL1052686924
Date: 2017.11.01 07:28:23 -0500

CF:
Chief, Operations (CESWG-OD-O, Karl Brown)



USACE016689

Report of Performance

Addicks & Barker Dams

New Pool of Record

UNITED STATES ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT

October 13, 2017

Robert Thomas, P.E., SWG, DSO

Gary Chow, P.E., SWG, DSPM

USACE016690

A1157

Report of Performance

Addicks & Barker Dams

EXECUTIVE SUMMARY

The Addicks and Barker dams' watersheds received between 32-35 inches of rain during a 4-day period, August 25, 2017 through August 29, 2017, when Hurricane Harvey stalled over the region. Addicks and Barker Dams were both empty, except for normal bayou flows, prior to the rainfall of Hurricane Harvey. On August 30, 2016, both Addicks & Barker dams reached new maximum pool of records at EL. 109.09ft and EL. 101.56ft, respectively. The previous maximum pool of records for Addicks and Barker Dams were recorded on April 23, 2016 at EL. 102.65ft and EL. 95.2ft, respectively.

In accordance with the Emergency Action Plan (EAP) for Addicks and Barker Dams, Stage 2 Extended Watch alert was activated on August 27, 2017 when the reservoirs' pool levels exceeded EL. 97.5ft and EL. 93.6ft, respectively. Teams of foundation observers were mobilized from the Galveston District to the site on August 26, 2017 in anticipation of exceeding the Stage 2 Extended Watch pool levels in order to monitor the performance of the dams around the clock. The 24/7 monitoring event began on August 27, 2017 and ended when the pools receded to the Stage 1 Extended Watch levels (September 15, 2017 for Addicks Dam, September 13, 2017 for Barker Dam). In general both dams functioned as expected throughout this flooding event, and no critical issues were observed that would impact the future performance of the dams.

When the reservoir pools exceeded EL. 101ft for Addicks Dam and EL. 95.7ft for Barker Dam, release from the reservoir were made following the Water Control Manual (WCM) November 2012 induced surcharge regulated releases. Induced surcharge regulated reservoir releases started on August 28, 2017 with Addicks reservoir at EL. 101.34ft and Barker reservoir at EL. 96.1ft. The maximum discharge rate was recorded on August 30, 2017 with 6514cfs for Addicks at 29.5 gate feet opening, and 4986cfs for Barker at 25 gate feet opening.

During this high pool event, several major thoroughfares inside the reservoirs were closed due to water inundation. These major thoroughfares were: Highway 6 at EL. 96ft, Eldridge Parkway at EL. 96.6ft for Addicks reservoir pool, and Westheimer Parkway at EL. 93.2ft, South Barker-Cypress Road at EL. 82.7ft for Barker reservoir. Additionally government-owned land upstream extends only to reservoir levels of EL. 103.0ft and EL. 95.0ft for Addicks and Barker dams respectively. Because of this, many local streets and residential houses upstream of the reservoirs were flooded. Uncontrolled release around the Addicks north end emergency spillway was observed on August 29, 2017 when the reservoir reached EL. 108ft. This release was observed to be limited to low velocity sheet flows.

POST EVENT EVALUATION

This report provides the findings and evaluation of the dam performance during the exceedance of the previous maximum pool of record. It is prepared and submitted in accordance with ER 1110-2-1156, Safety of Dams, Policy and Procedures, 31 March 2014. Following are the findings and evaluation of the dam performance during the Stage 2 Extended Watch 24/7 monitoring event and the post event inspection:

Stage 2 Observations Teams

In general, the observation teams did not find any critical issues that could impact the proper performance of the dams. The observers were primarily composed of civil, structural, geotechnical, and hydrology & hydraulic engineers. Technicians having previous dam safety training were also selected to help fill the gaps in the observation teams. Observers were trained in identifying any potential defects or damages, such as sand boils, surface erosions, slides, seepages, and depressions etc., which might occur during a high reservoir pool event. The dam monitoring activities were carried out by two 12-hour shifts consisting of four teams of 2-person observers plus a chief foundation observer to coordinate the operations. The reservoir pools and downstream water levels were monitored by one 12-hour shift consisting of two teams of 2-person hydraulic observers. Cellular devices in conjunction with Addicks and Barker observer maps were used to relay data back to the chief foundation observer.

Dam Embankment Performance

There were no critical findings observed during this Stage 2 Extended Watch for both Addicks and Barker dams. The foundation observers were responsible to inspect the following: the crest, the upstream and downstream slope, the downstream toe areas, the dam side banks of Turkey Creek at Addicks Dam and the dam side banks of Clodine Ditch and Barker Ditch at Barker Dam. The following are some of the non-critical findings that were observed and continuously monitored during the Stage 2 Extended Watch event:

- a) Addicks Dam – The crest of the cofferdam had deteriorated to a point where transiting across it by vehicle was becoming an issue for the inspection teams. The crest of dam towards Clay Road had deteriorated prior to this high pool event, but worsened as vehicular continued to use it for this event. The road surface of the ramp from outlet structure to dam crest had deteriorated where the foundation geotextile was exposed. Erosion, caused by elevated tail water in combination with surface drainage of the slope, was observed on the downstream side of the cofferdam near survey posts. Near the pool of record, observers noted that there was uncontrolled low velocity sheet flow release around north end of Addicks's emergency spillway.
- b) Barker Dam – The crest of the cofferdam had deteriorated to a point where transiting across it by vehicle was becoming an issue for inspection teams. Observers noted a wet soft area just north of the construction area at the outlet structure on the downstream side of the

embankment, but it is expected this was due to the higher level of pedestrian traffic it received. No seepage through the embankment was observed in the wet spot region.

Outlet Structure Performance

During this pool of record there were many first time occurrences for both outlet structures. By following the WCM's induced surcharge regulated releases, both Addicks and Barker Dam outlet structures reached a new maximum discharge rate. Elevated tail waters at the outlet conduits was the results of the downstream rainfall. This caused all conduits for both dams to become pressurized during the induced surcharge regulated releases. The foundation observers were responsible for inspection of the following: the crest of the outlet structure, the downstream and upstream slopes at the outlet structure, the toe area of embankment at outlet structure, the erosion protection of the downstream channel embankments. The outlet observers were responsible for inspection of the following: upstream inlet structures, and downstream outlet structures. Following emptying of the Addicks and Barker reservoirs, the conduits were visually inspected on 19 October 2017 by a team of structural and hydraulic engineers.

- a) Addicks Dam – The reservoir pool elevation caused the walkway bridge to become submerged as shown in figure 1. Due to safety concerns the power supply to the gate machinery was turned off until the reservoir pool elevations dropped. Operations of the outlet structure gates was conducted through the use of a battery powered hand drill until the power could be restored. Observers reported transverse cracking at top of the headwall on the downstream side of dam when induced surcharge regulated release were started. This was further assessed to not be an issue related to discharge rates by the Galveston District's Structural SME, Risk Management Center (RMC), and Dam Safety CoP. Elevated tail water caused the downstream wing walls of the outlet structure to be overtopped from the backside with a lower water elevation in the stilling basin, but no issues were seen from this. During the induced surcharge regulated release, a vortex formed at the Addicks Dam intake structure gate #2. This vortex formation was assessed by the RMC and deemed not an issue unless loud audible banging sound is heard, or large vibrations at intake structure is observed. The air intakes of the outlet structure became submerged causing debris to constrict air flow. It was documented that once the debris were cleared from the air intakes, the vortex caused by discharges from the outlet structure changed. During this event it was observed that conduit #1 had higher discharge velocities than the other 4 conduits. Evaluation of Addicks's outlet structure conduit joints after the pool of record is represented in Figure 2. Examination of all joints appeared to be in good shape with minor leakage due to small cracks in the conduit.



FIGURE 1 ADDICKS DAM GATE TOWER SUBMERGED.

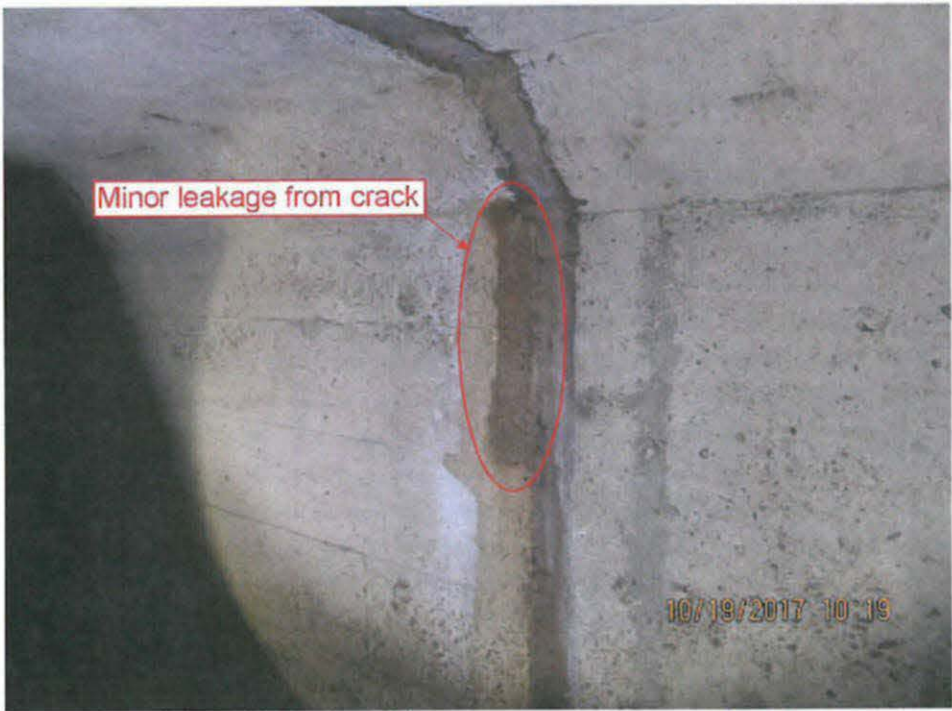


FIGURE 2 TYPICAL CONDUIT JOINT AT ADDICKS OUTLET STRUCTURE.

- c) Barker Dam - Because of induced surcharge regulated release, a vortex was seen to have formed on the upstream side of Barker's outlet structure at gate #2. This vortex formation was assessed by the RMC and deemed not an issue unless loud audible banging sound is heard, or large vibrations at intake structure is observed. The reservoir's pool submerged the air intakes for conduit #3 during this pool of record, causing it to be clogged with debris. After clearing out the debris, it was noted that the vortex on the upstream side of the outlet structure changed. The main power breaker used for supplying power to the outlet structure, presented in figure 3, is located downstream near Clodine ditch across from project office. It was damaged during this pool of record when it was submerged in the tailwaters. Examination of the conduits in the post event inspection showed that minor spalling, displayed in figure 4, occurred near the gate at for conduit #4. Also during this inspection, minor damage was noted to the 3rd joint downstream of conduit #3 as seen in figure 5.



FIGURE 3 DAMAGED BARKER DAM MAIN POWER BREAKER 4.5FT ABOVE GROUND.



FIGURE 4 SPALLING NEAR GATE FOR BARKER OUTLET CONDUIT #4.

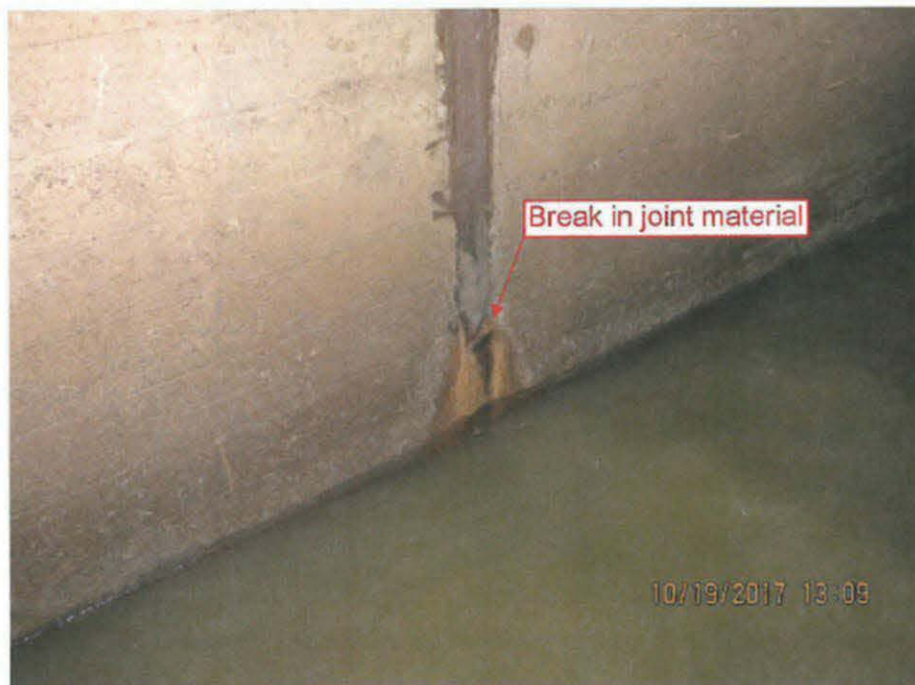


FIGURE 5 JOINT DAMAGE TO 3RD DOWNSTREAM JOINT OF BARKER OUTLET CONDUIT #3.

Emergency Spillway Performance

The north end emergency spillway of the Addicks dam was flanked by a shallow depth low velocity sheet flow from the reservoir pool. This uncontrolled release is illustrated in figure 6. The full capacity of the emergency spillway was not reached with only the end scour pad going underwater. This is because the top elevation of the emergency spillway is higher than the scour pad. No issues were observed with the emergency spillways during this event. The emergency spillways of the south end of Addicks Dam, and both at Barker Dam did not see any flows.



FIGURE 6 UNCONTROLLED RELEASE AT THE NORTH ADDICKS EMERGENCY SPILLWAY.

Instrumentations

- a) Conduit Survey Pins – On 20 October 2017 a post event survey was performed for the monitoring pins of the Addicks and Barker outlet conduits. The results, listed in Tables 1 and 2, show no significant movement of the conduits when compared with the 2016 surveys.

TABLE 1 POST EVENT SURVEY OF ADDICKS DAM CONDUITS.

PIN		2016 SURVEY (FT)	2017 SURVEY (FT)	Δ 2016 & 2017 (FT)
AMJ-1-RT	A TO C	0.859	0.869	0.010
	B TO C	0.809	0.815	0.006
AMJ-2-RT	A TO C	0.867	0.87	0.003
	B TO C	0.614	0.616	0.002
AMJ-3-RT	A TO C	0.857	0.862	0.005
	B TO C	0.612	0.615	0.003
AMJ-4-RT	A TO C	0.869	0.881	0.012
	B TO C	0.623	0.627	0.004
AMJ-5-RT	A TO C	0.831	0.838	0.007
	B TO C	0.598	0.603	0.005
AMJ-6-RT	A TO C	0.857	0.861	0.004
	B TO C	0.601	0.604	0.003
AMJ-7-RT	A TO C	0.825	0.838	0.013
	B TO C	0.579	0.583	0.004
AMJ-8-RT	A TO C	0.880	0.885	0.005
	B TO C	0.610	0.614	0.004
AMJ-1-LT	A TO C	0.851	0.857	0.006
	B TO C	0.605	0.603	-0.002
AMJ-2-LT	A TO C	0.863	0.868	0.005
	B TO C	0.595	0.601	0.006
AMJ-3-LT	A TO C	0.826	0.836	0.010
	B TO C	0.593	0.603	0.010
AMJ-4-LT	A TO C	0.850	0.857	0.007
	B TO C	0.613	0.617	0.004
AMJ-5-LT	A TO C	0.853	0.858	0.005
	B TO C	0.612	0.614	0.002
AMJ-6-LT	A TO C	0.851	0.855	0.005
	B TO C	0.613	0.619	0.006
AMJ-7-LT	A TO C	0.861	0.864	0.003
	B TO C	0.609	0.615	0.006
AMJ-8-LT	A TO C	0.812	0.819	0.007
	B TO C	0.597	0.602	0.005

TABLE 2 POST EVENT SURVEY OF BARKER DAM CONDUITS.

PIN		2016 SURVEY (FT)	2017 SURVEY (FT)	Δ 2016 & 2017 (FT)
BMJ-1-RT	A TO C	0.898	0.902	0.004
	B TO C	0.627	0.631	0.004
BMJ-2-RT	A TO C	0.913	0.888	-0.025
	B TO C	0.580	0.583	0.003
BMJ-3-RT	A TO C	0.875	0.876	0.001
	B TO C	0.633	0.638	0.005
BMJ-4-RT	A TO C	0.858	0.861	0.003
	B TO C	0.603	0.605	0.002
BMJ-5-RT	A TO C	0.849	0.85	0.001
	B TO C	0.586	0.587	0.001
BMJ-6-RT	A TO C			0.000
	B TO C			0.000
BMJ-7-RT CEILING	A TO C			0.000
	B TO C			0.000
BMJ-1-LT	A TO C	0.813	0.816	0.003
	B TO C	0.614	0.616	0.002
BMJ-2-LT	A TO C	0.869	0.873	0.004
	B TO C	0.636	0.639	0.003
BMJ-3-LT	A TO C	0.841	0.845	0.004
	B TO C	0.588	0.586	0.000
BMJ-4-LT	A TO C	0.811	0.815	0.004
	B TO C	0.603	0.606	0.003
BMJ-5-LT	A TO C	0.844	0.847	0.003
	B TO C	0.589	0.591	0.002
BMJ-6-LT	A TO C	0.832	0.837	0.005
	B TO C	0.62	0.622	0.002
BMJ-7-LT CEILING	A TO C			0.000
	B TO C			0.000

- b) Piezometer measurements – Piezometers located at each dam were measured daily during Stage 1 & 2 of this pool of record, and then plotted for evaluation. The results generally presented regular responses to the rising pool, and no sudden or unusual rises were recorded throughout the event. There are few spikes in the piezometer graphs that have been determined to be errors in reading the water elevations out in the field. There is historical issues with the readings from piezometer P-7 since the clean out performed in 2013. It is expected that during installation of this piezometer that a collapse occurred of the above clay layer into the targeted elevation of lower sand layer causing errors in readings. This piezometer's readings should be ignored, and in the future replaced with another piezometer. Some of the piezometers adjacent to the outlet wall and conduits indicated influences from the backwater in the outlet channel. These were mostly due to some communications of backwater pressure through the spillway retaining wall and head wall joints. No critical issues were observed. Results of the piezometer data plots are presented in figure 7 through figure 18.

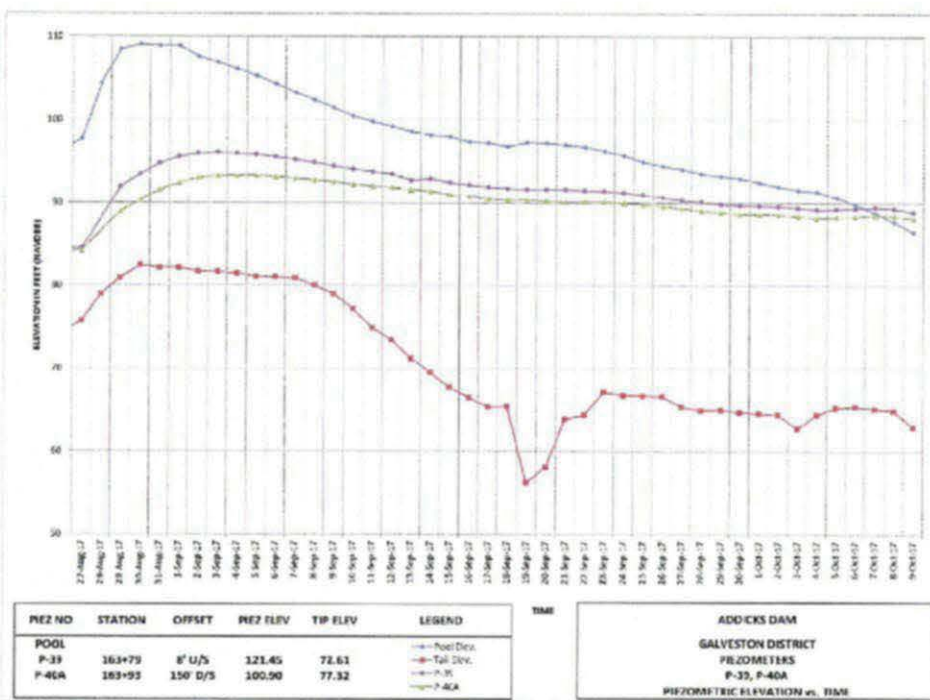


FIGURE 7 ADDICKS DAM PIEZOMETERS P-39 & P-40A.

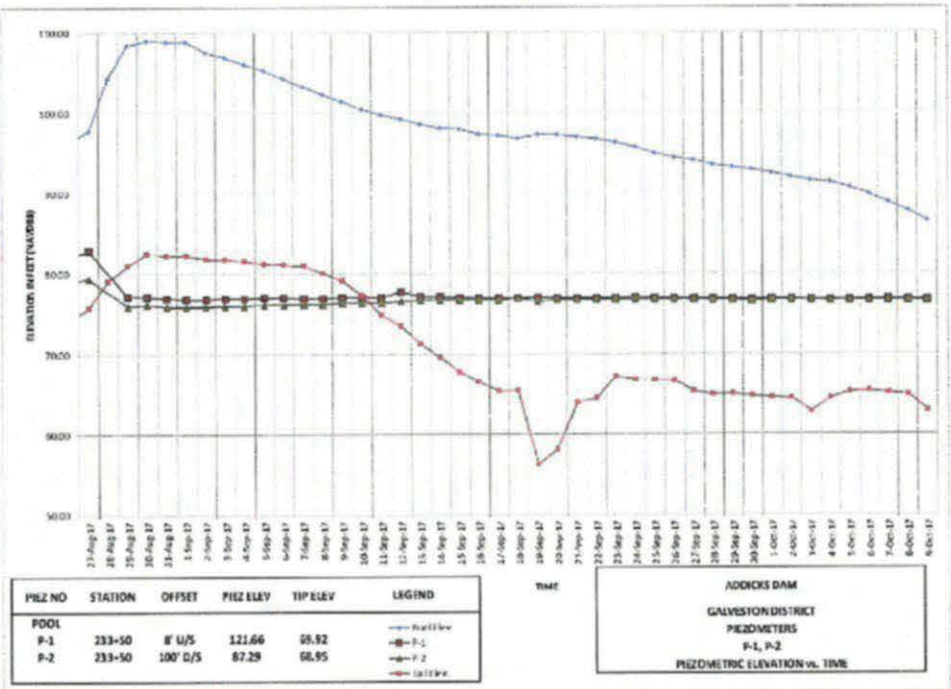


FIGURE 8 ADDICKS DAM PIEZOMETERS P-1 & P- 2.

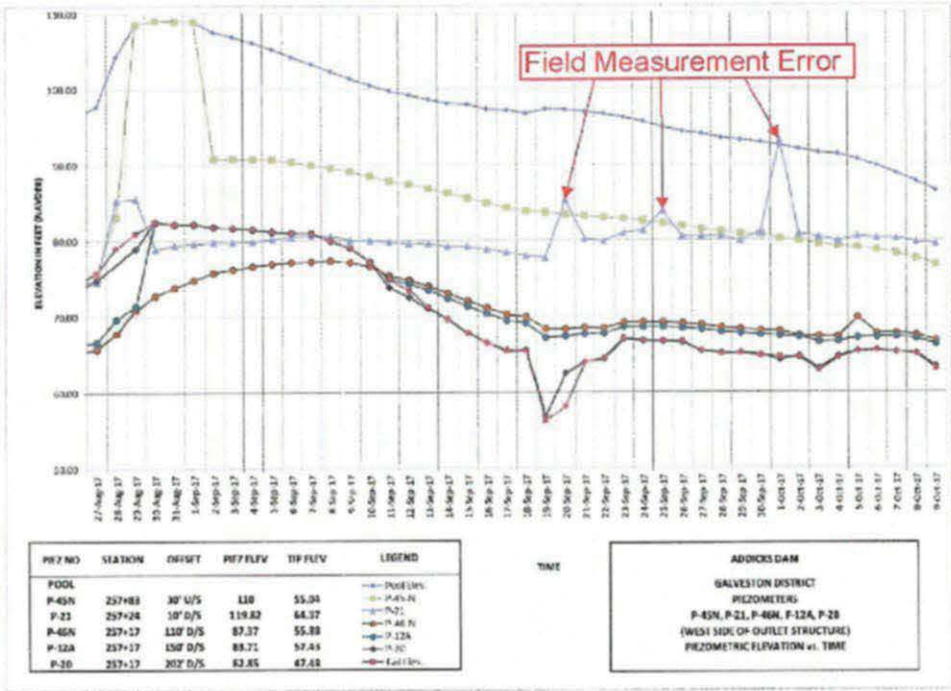


FIGURE 9 ADDICKS DAM PIEZOMETERS P-45N, P-21, P-46N, P12A & P- 20.

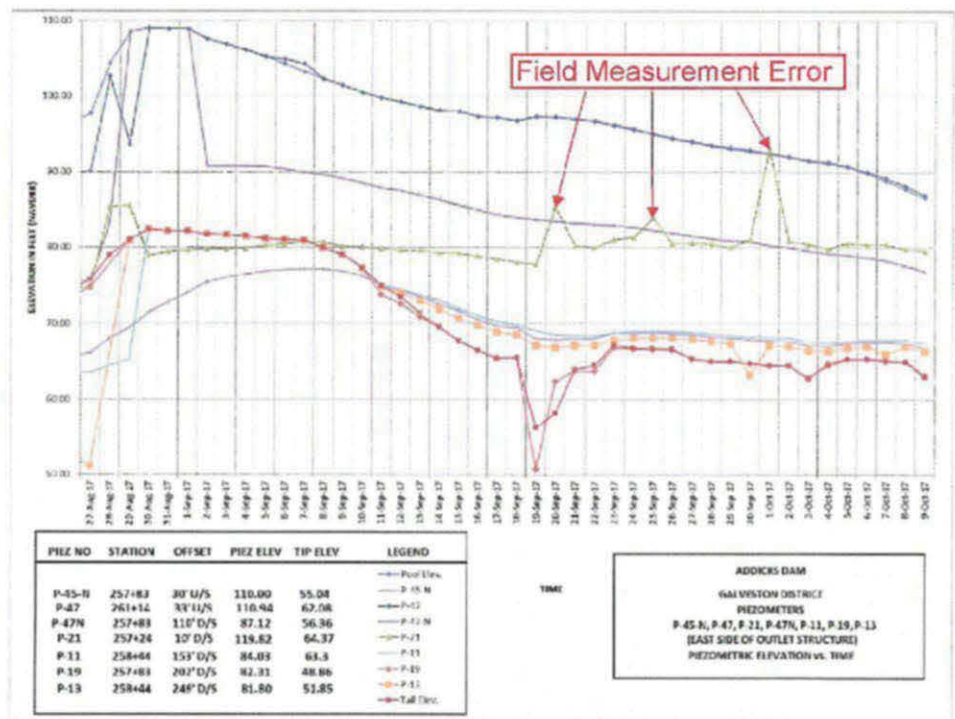


FIGURE 10 ADDICKS DAM PIEZOMETERS P-45N, P-47, P-47N, P-21, P-11, P-19 & P-13.

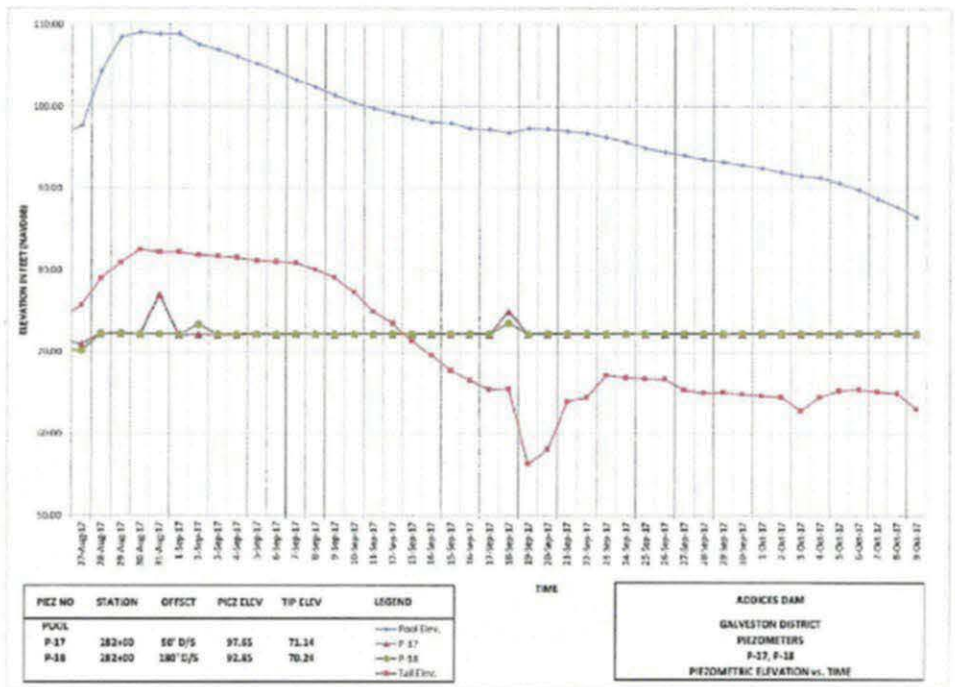


FIGURE 11 ADDICKS DAM PIEZOMETERS P-17 & P-18.

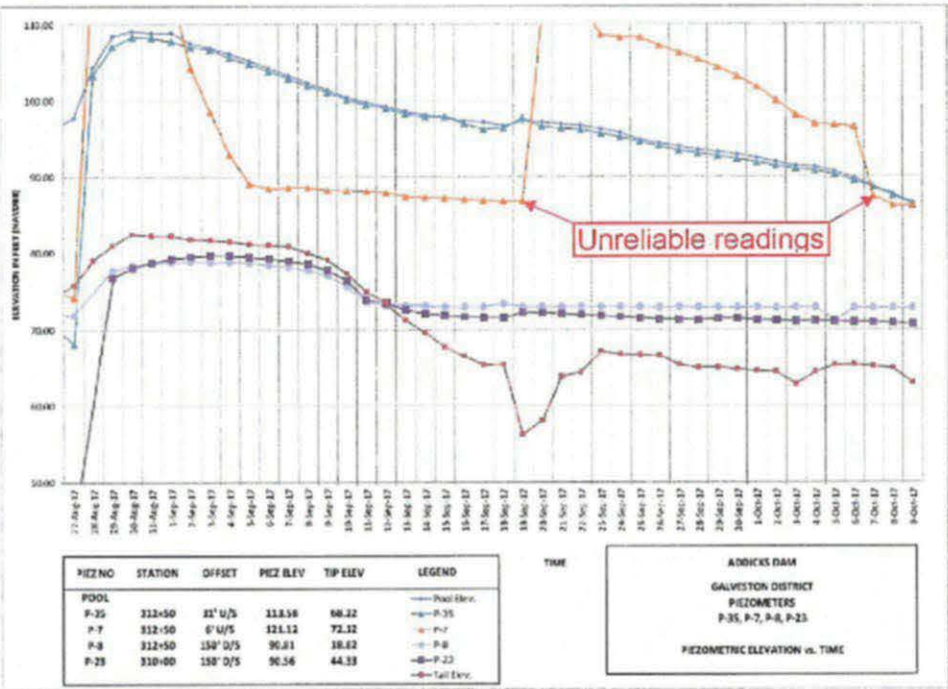


FIGURE 12 ADDICKS DAM PIEZOMETERS P-35, P-7, P-8 & P-23.

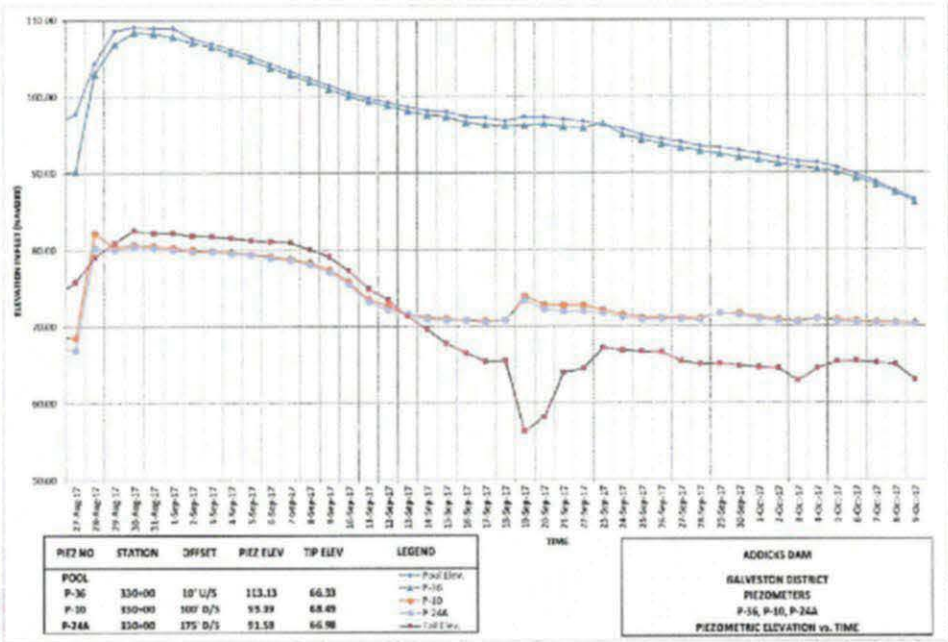


FIGURE 13 ADDICKS DAM PIEZOMETERS P-36, P-10 & P-24A.

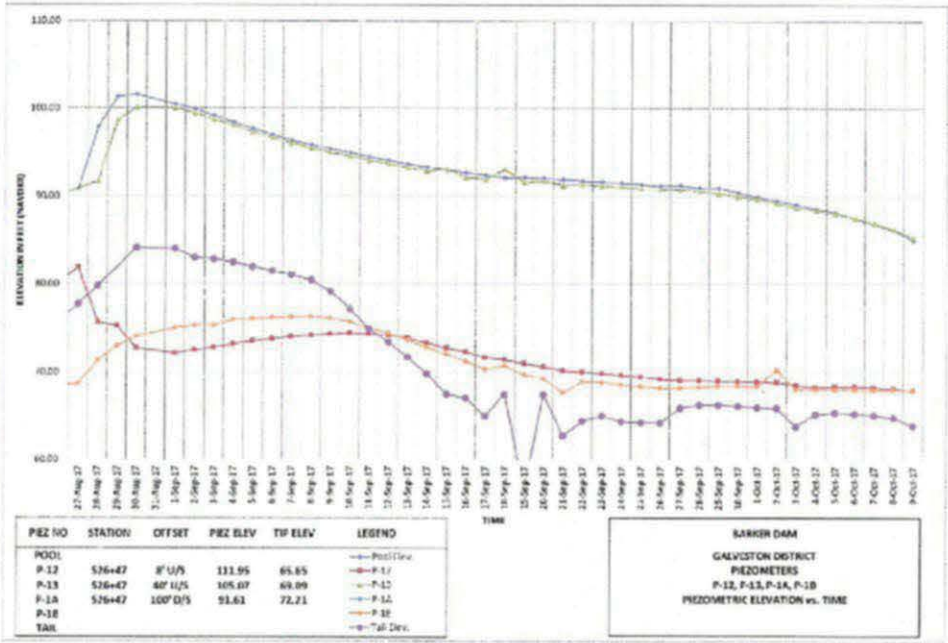


FIGURE 14 BARKER DAM PIEZOMETERS P-12, P-13, P-1A & P-1B.

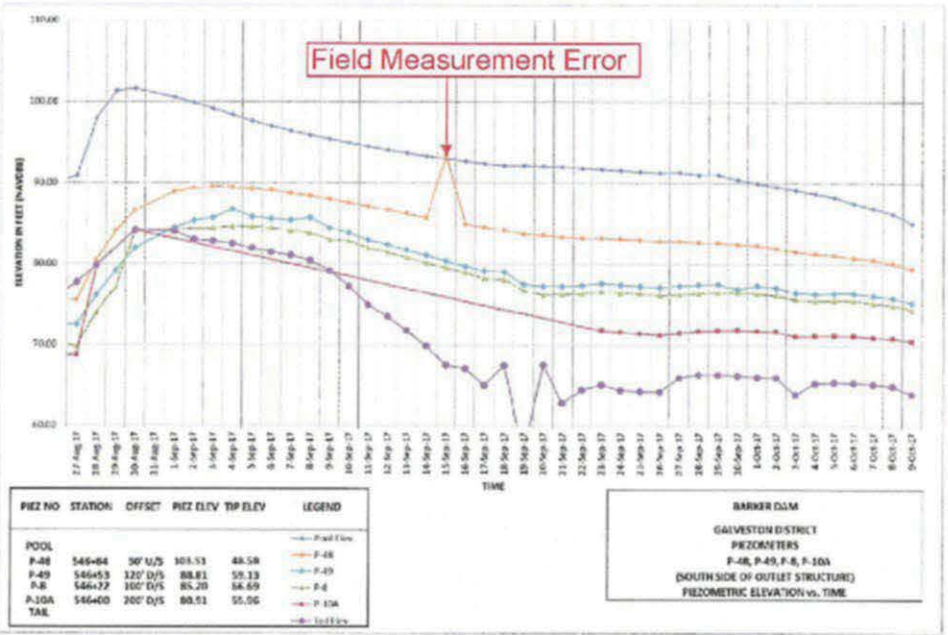


FIGURE 15 BARKER DAM PIEZOMETERS P-48, P-49, P-8 & P-10A.

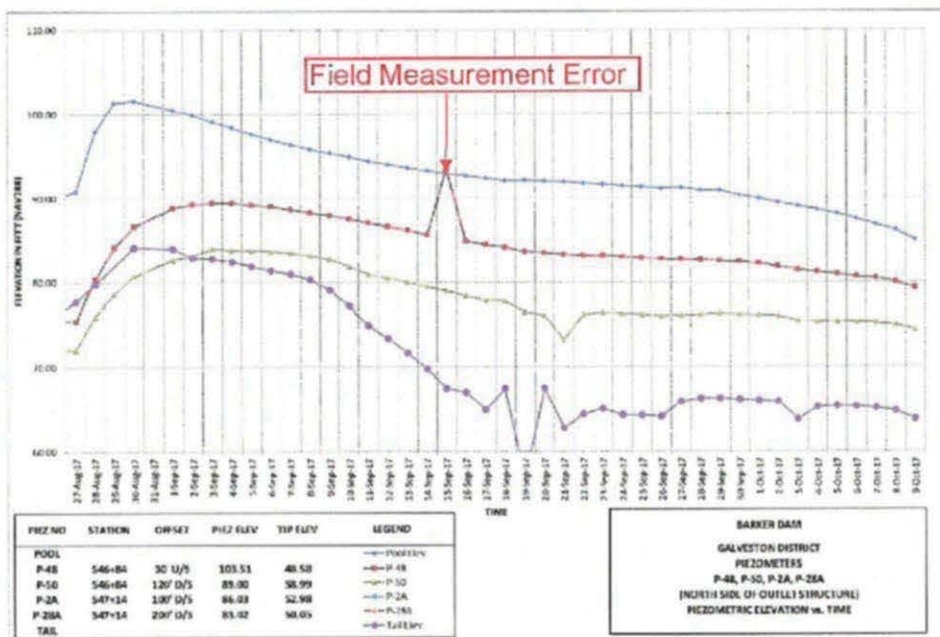


FIGURE 16 BARKER DAM PIEZOMETERS P-48, P-50, P-2A & P-28A.

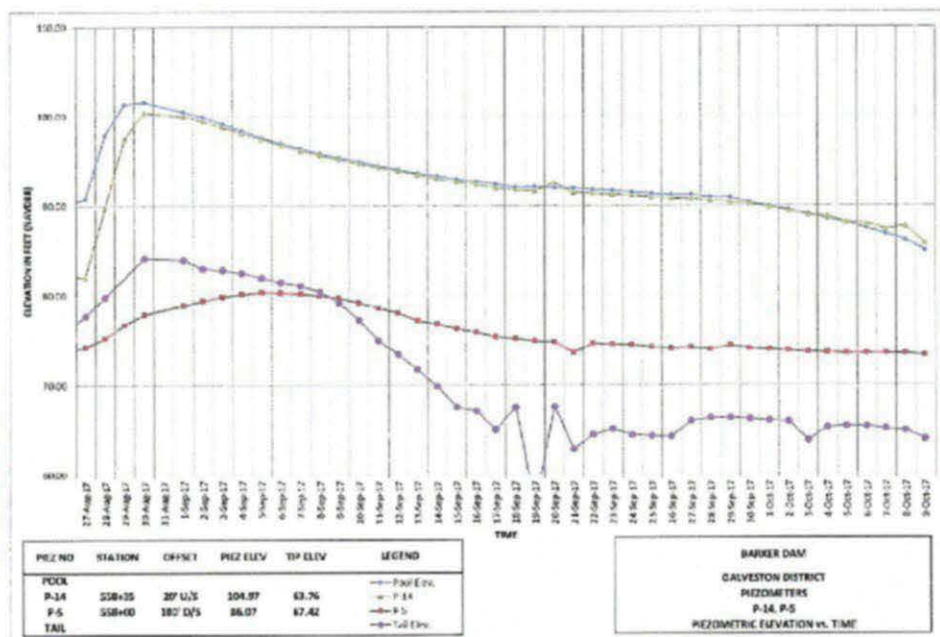


FIGURE 17 BARKER DAM PIEZOMETERS P-14 & P-5.

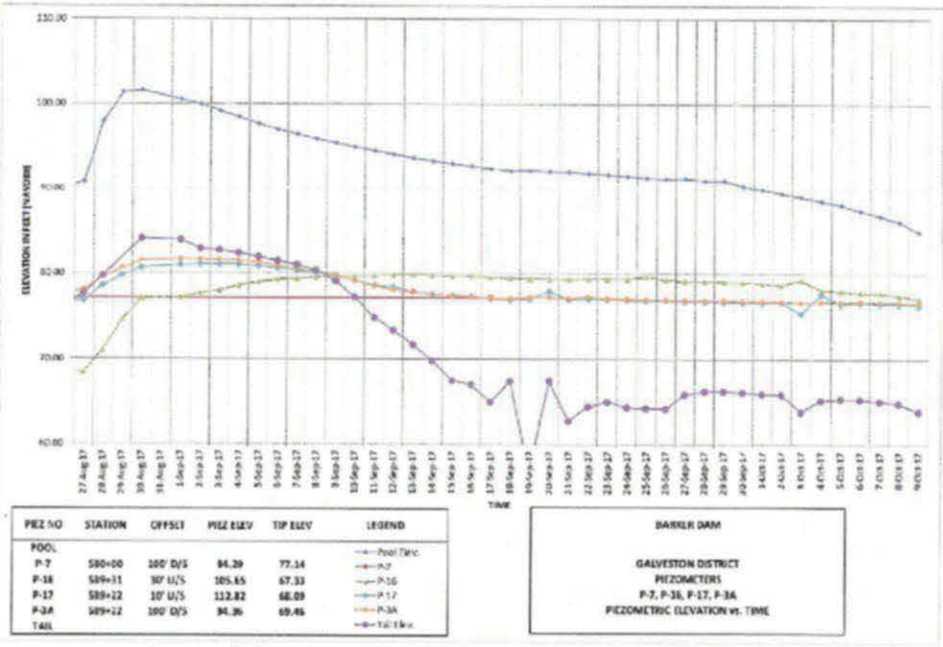


FIGURE 18 BARKER DAM PIEZOMETERS P-7, P-16, P-17 & P-3A.

Colonel Lars Zetterstrom

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IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re DOWNSTREAM ADDICKS) Sub-Master Docket
AND BARKER (TEXAS)) No. 1:17-9002 L
FLOOD-CONTROL RESERVOIRS)
_____) Chief Judge Susan G. Braden
)
THIS DOCUMENT RELATES TO:)
)
ALL DOWNSTREAM CASES)

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re UPSTREAM ADDICKS) Sub-Master Docket
AND BARKER (TEXAS)) No. 17-9001L
FLOOD-CONTROL RESERVOIRS)
_____) Judge Charles F. Lettow
)
THIS DOCUMENT RELATES TO:)
)
ALL UPSTREAM CASES)

Colonel Lars Zetterstrom

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ORAL VIDEOTAPED DEPOSITION

COLONEL LARS N. ZETTERSTROM

SEPTEMBER 6, 2018

ORAL VIDEOTAPED DEPOSITION OF COLONEL LARS N. ZETTERSTROM, produced as a witness at the instance of the Individual Downstream Plaintiffs and duly sworn, was taken in the above-styled and numbered cause on the 6th day of September, 2018, from 10:36 a.m. to 6:33 p.m., before Melinda Barre, Certified Shorthand Reporter in and for the State of Texas, reported by computerized stenotype machine at the offices of U.S. Army Corps of Engineers, 2000 Fort Point Road, Galveston, Galveston County, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto.

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APPEARANCES

FOR THE UNITED STATES DEPARTMENT OF JUSTICE:

Mr. William Shapiro

Ms. Kristine Tardiff

Ms. Mayte Santacruz

U.S. DEPARTMENT OF JUSTICE

Ben Franklin Station

P.O. Box 7611

Washington, D.C. 20004-7611

Telephone: 202.305.0481

E-mail: william.shapiro@usdoj.gov

COUNSEL FOR UNITED STATES ARMY CORPS OF ENGINEERS GALVESTON DIVISION:

Mr. James Purcell

U.S. ARMY CORPS OF ENGINEERS GALVESTON DISTRICT

E-mail: james.a.purcell@usace.army.mil

Phone: 409.766.3822

ALSO PRESENT: Timothy McCable, Videographer;

John Marsh

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APPEARANCES

FOR INDIVIDUAL DOWNSTREAM PLAINTIFFS AS TO JURISDICTIONAL DISCOVERY, THE GOVERNMENT'S MOTION TO DISMISS, AND SCHEDULING:

Mr. Jack E. McGehee

Mr. H.C. Chang

Mr. Benjamin C. Feiler

McGEHEE CHANG LANDGRAF

10370 Richmond Avenue, Suite 1300

Houston, Texas 77042

Telephone: 713.864.4000

E-mail: jmcgehee@lawtx.com

FOR DOWNSTREAM PRE-TRIAL DISCOVERY, DISPOSITIVE MOTIONS, AND/OR TRIAL ON LIABILITY, AND SCHEDULING:

Mr. Rand P. Nolen

Mr. David Hobbs

FLEMING NOLEN JEZ, L.L.P.

2800 Post Oak Boulevard, Suite 4000

Houston, Texas 77056-6109

Telephone: 713.621.7944

E-mail: rand.nolen@flaming-law.com

FOR UPSTREAM INDIVIDUAL PLAINTIFFS AS TO PRE-TRIAL DISCOVERY AND DISPOSITIVE MOTIONS:

Mr. Armistead Easterby

WILLIAMS KHERKHER HART BOUNDAS, LLP

8441 Gulf Freeway, Suite 600

Houston, Texas 77017-5051

Telephone: 713.230.2000

E-mail: aeasterby@williamskherkher.com

FOR MEMORIAL SMC TEST PROPERTY:

Mr. Ferguson McNiel

VINSON & ELKINS, LLP

1001 Fannin, Suite 2500

Houston, Texas 77002-6760

Telephone: 713.230.2000

E-mail: fmcniel@velaw.com

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2 (Pages 2 to 5)

Colonel Lars Zetterstrom

<p style="text-align: right;">10</p> <p>1 THE VIDEOGRAPHER: Today is September 6, 2 2018. The time now is 10:36 a.m. We're on the record. 3 Would you please swear the witness. 4 COLONEL LARS N. ZETTERSTROM, 5 having been first duly sworn, testified as follows: 6 EXAMINATION 7 QUESTIONS BY MR. McGEHEE: 8 Q. Commander Zetterstrom, I'm Jack McGehee. A few 9 preliminaries. I represent about 9,000 people who have 10 filed documents that say you did nothing wrong in this 11 case. They filed documents that say everything you did 12 was by the book. They filed documents that said 13 whatever happened to them, they get it; it was for the 14 greater good. Have you ever been involved in a lawsuit 15 like this? 16 A. No, sir. 17 Q. There are 42 lawyers involved who believe when 18 they filed their documents, that you did nothing wrong 19 and that everything you did was an authorized act. Do 20 you get it? 21 MR. SHAPIRO: What do you mean "get it"? 22 Q. (By Mr. McGehee) Do you get it? 23 MR. SHAPIRO: Object, vague. 24 Q. (By Mr. McGehee) He's talking to the record. 25 Do you get it?</p>	<p style="text-align: right;">12</p> <p>1 we're going. If for any reason you don't know exactly 2 where we're going, I want you to let me know; and we'll 3 make sure that you get caught up or I ask better 4 questions. Fair enough? 5 A. Yes, sir. 6 Q. Speaking of the authorized act, I want to play 7 a clip; and after the clip I'm going to ask two 8 questions. No. 1, was that you; No. 2, did you speak 9 honestly? I know what the answer is going to be. And 10 then we're going to talk about it a bit. Okay? 11 A. Yes, sir. 12 (Audio clip playing) 13 LARS ZETTERSTROM: (via audio clip:) 14 (inaudible) "using our water control manual as its 15 guide. The water control manual is a document that was 16 created jointly between the Army Corps of Engineers and 17 Harris County in anticipation of future storm events." 18 (End of audio clip) 19 Q. (By Mr. McGehee) Is that you? 20 A. Yes. 21 Q. Are you telling the truth about the water 22 control manual? I'm sure you did. 23 A. Yes. 24 Q. Tell the Judge what the water control manual 25 is.</p>
<p style="text-align: right;">11</p> <p>1 A. I believe I do, sir. 2 Q. Okay. I think what you did was an authorized 3 act by the book. Do you agree with that? 4 A. Yes. 5 Q. Okay. And I just wanted to set that straight 6 because sometimes witnesses are defensive and they're 7 trying to justify their conduct. I want to know if 8 there's anything that you've been told by anybody that 9 would inhibit your ability today to be brutally honest 10 in favor of the homeowners or in favor of anything that 11 you did during Hurricane Harvey. Is there anything that 12 inhibits you from being brutally honest? 13 A. My duty is to tell the truth, sir. 14 Q. Good. Because there's a whole bunch of folks 15 that are counting on that. Okay? If we get into any 16 questions where you think you're conflicted or you're 17 inhibited to tell the truth, will you flag it and talk 18 to me about it? 19 A. Yes, sir. I do not anticipate that will be 20 necessary. I will tell the truth. 21 Q. Good. I don't think so either. We have a 22 procedure that's probably unlike any other depositions. 23 I'm going to play you clips from time to time. I'm 24 going to show you articles where you're quoted from time 25 to time and I'm going to have blowups that outline where</p>	<p style="text-align: right;">13</p> <p>1 A. The water control manual is the document that 2 is used to govern water control decisions. 3 Q. If we fed -- go with me on this. If we had a 4 computer that y'all created and we fed the water control 5 manual into that computer so that the only decisions 6 that were made during Hurricane Harvey came out of that 7 computer and that computer was following the water 8 control manual -- are you with me in my hypothetical? 9 A. I think so. 10 Q. -- would the computer have made any different 11 decisions than you made? 12 A. That's a very subjective and obviously 13 hypothetical question. Difficult for me to answer what 14 the computer would do versus what the humans did or 15 would do given the models and the water control manual. 16 Q. And I'm saying that you fed the water control 17 manual and all your models into the computer. Would the 18 computer have made a different decision than you made? 19 MR. SHAPIRO: Object to the form of the 20 question. 21 A. Based off of this hypothetical, I do not 22 believe that a computer receiving the input that you 23 described would have made a different decision. 24 Q. (By Mr. McGehee) I agree with that. Thanks for 25 your answer.</p>

4 (Pages 10 to 13)

Colonel Lars Zetterstrom

<p style="text-align: right;">14</p> <p>1 The outcome -- and I'm focusing on the</p> <p>2 induced surcharge. I'm focusing on opening the gates.</p> <p>3 And for the record -- and I'd like you to just look</p> <p>4 around back here if you would for me. I'm talking about</p> <p>5 the two reservoirs, the gates at the two reservoirs.</p> <p>6 And when I talk about -- I'm sorry. When I talk about</p> <p>7 the induced surcharge, you know exactly what I'm talking</p> <p>8 about, don't you?</p> <p>9 A. Can you point out to me where you think the</p> <p>10 gates are, sir?</p> <p>11 Q. Yeah. I think the gates are here, and the</p> <p>12 induced surcharge came through those outlets. Is that</p> <p>13 correct?</p> <p>14 A. The controlled releases were released through</p> <p>15 those outlet structures.</p> <p>16 Q. Okay. And tell the Judge what induced</p> <p>17 surcharge is because we're going to be using that word a</p> <p>18 lot.</p> <p>19 A. Surcharge is a term used to describe optimizing</p> <p>20 the capacity of the reservoirs and minimizing risk to</p> <p>21 the structures.</p> <p>22 Q. If you had not followed the induced surcharge</p> <p>23 protocol and kept the gates closed, that would have been</p> <p>24 a violation of the water control manual, correct?</p> <p>25 MR. SHAPIRO: Object to the form of the</p>	<p style="text-align: right;">16</p> <p>1 outlined in the water control manual, the water is going</p> <p>2 to come around out here and go down into Spring Valley</p> <p>3 and other neighborhoods and affect other neighborhoods</p> <p>4 first, correct?</p> <p>5 A. I can't comment on the particular communities</p> <p>6 you just mentioned.</p> <p>7 Q. Why not?</p> <p>8 A. Because I don't have that information, sir.</p> <p>9 Q. Okay. Where I'm gesturing, would the water</p> <p>10 come out this way?</p> <p>11 A. It would come out around the northern end of</p> <p>12 the dam.</p> <p>13 Q. That's the northern end of the dam?</p> <p>14 A. Yes, sir.</p> <p>15 Q. It would come out around this way?</p> <p>16 A. It would flow based off of the topography and</p> <p>17 the amount of water that went around the end of the dam.</p> <p>18 Q. Do you see my gesture?</p> <p>19 A. I see your gesture.</p> <p>20 Q. It's correct, isn't it?</p> <p>21 A. I do not know.</p> <p>22 Q. You don't know if the water would have come</p> <p>23 around this way?</p> <p>24 A. No, sir.</p> <p>25 Q. What would you need to know that?</p>
<p style="text-align: right;">15</p> <p>1 question.</p> <p>2 A. I don't know if I would use the word</p> <p>3 "violation."</p> <p>4 Q. (By Mr. McGehee) Use your word then. Answer my</p> <p>5 question using words that you're comfortable with.</p> <p>6 A. It would not be in accordance with the water</p> <p>7 control manual.</p> <p>8 Q. If the gates had been kept closed -- and I want</p> <p>9 to go up here and look at this. If the gates had never</p> <p>10 been opened and there was never an induced surcharge, I</p> <p>11 think you've described before what would happen. And</p> <p>12 what would happen is the water would have spilled out</p> <p>13 around the ends of the dam and gone into different</p> <p>14 neighborhoods, correct?</p> <p>15 A. Yes.</p> <p>16 Q. Okay. And we have some quotes that we have</p> <p>17 from you, and I'm going to show you the quotes. And</p> <p>18 you've said before that it's going to be better to</p> <p>19 release the water, goes directly into Buffalo Bayou as</p> <p>20 opposed to letting it go around the ends and through</p> <p>21 additional neighborhoods and then ultimately into the</p> <p>22 bayous. Is that just what we talked about?</p> <p>23 A. That is an accurate quote that I stated.</p> <p>24 Q. Okay. And what you meant was if we keep the</p> <p>25 gates closed and we're not following the procedures</p>	<p style="text-align: right;">17</p> <p>1 A. The amount of water that was going around the</p> <p>2 end of the dam.</p> <p>3 Q. How much was going around the end of the dam</p> <p>4 before you opened the gates?</p> <p>5 A. I do not know.</p> <p>6 Q. Just a little bit. True? You said that, just</p> <p>7 a little bit. True?</p> <p>8 A. My recollection of the approximate amount of</p> <p>9 water that flowed around the end, the northern end of</p> <p>10 Addicks dam is approximately 2,000 cubic feet per</p> <p>11 second.</p> <p>12 Q. And what would that inundate? What</p> <p>13 neighborhoods would that inundate?</p> <p>14 A. I do not know.</p> <p>15 (Exhibits 1 and 2 marked)</p> <p>16 MR. McGEHEE: For the record the big</p> <p>17 blowup deposition Exhibit 1 that shows the two dams and</p> <p>18 the release gates and the quote from Colonel Zetterstrom</p> <p>19 is deposition Exhibit 2.</p> <p>20 MR. SHAPIRO: Jack, do you have copies of</p> <p>21 those? How are we going to make these exhibits?</p> <p>22 MR. McGEHEE: These exhibits are going to</p> <p>23 be part of the record.</p> <p>24 MR. SHAPIRO: How are we going to attach</p> <p>25 it to the deposition?</p>

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<p style="text-align: right;">18</p> <p>1 MR. McGEHEE: The way we've done every 2 other deposition exhibit. We're going to take pictures 3 of it and then attach it to the record. 4 MR. SHAPIRO: Okay. So at the close of 5 the deposition we'll take photographs, and then the 6 photographs will be the exhibits? 7 MR. McGEHEE: Yes. And maybe it wasn't 8 you; but we've had a standing agreement with others that 9 anytime anybody, you or your side or our side, uses 10 blowups, the procedure will be to condense the blowups 11 into 8-1/2 by 11, include it in the transcript. And the 12 person that is the custodian of the deposition keeps the 13 blowups for anybody to inspect who requests it. And 14 then the court reporter will take pictures of these at 15 the end to reflect the writing or whatever else is on 16 the blowup. 17 MR. SHAPIRO: Okay. So I'm not familiar 18 with that agreement, but it sounds fine. I'm just 19 curious as to what the actual exhibit to the deposition 20 will be. Will it be the blowups, or will it be the 21 photographs? 22 MR. McGEHEE: It will be a photograph. 23 MR. SHAPIRO: Okay. I agree with that. 24 MR. McGEHEE: Okay. 25 THE WITNESS: May I ask a question?</p>	<p style="text-align: right;">20</p> <p>1 Q. (By Mr. McGehee) Surrounding communities means 2 the communities around the northern end of the dam, 3 correct? 4 A. In part, yes. 5 Q. What's the other part? 6 A. It depends on the time frame that you're 7 referencing to. 8 Q. I'm talking about August 28th. 9 A. Without looking at the CWMS models, I can't 10 entirely answer your question in terms of which 11 surrounding communities you're referring to. 12 Q. When you were talking to the people, what did 13 you mean by "surrounding communities"? 14 A. In fact, what occurred was water flowed around 15 the northern end of Addicks dam. But during Hurricane 16 Harvey the forecast also predicted that water would flow 17 around both ends of Barker dam. 18 Q. And that forecast never came true? 19 A. The additional rainfall did not fall. 20 Q. Okay. So any more qualifications to the 21 surrounding communities? 22 A. No, sir. 23 Q. Are you familiar with the deviation that was in 24 place since 2016 regarding the water flow at Piney 25 Point?</p>
<p style="text-align: right;">19</p> <p>1 (Discussion off the record) 2 MR. SHAPIRO: Jack, the colonel has 3 indicated that you're mispronouncing his name. 4 Q. (By Mr. McGehee) Say your name for me. 5 A. My name is Zetterstrom. 6 Q. Zetterstrom? 7 A. Zetterstrom, sir, not Zetterstorm. 8 Q. My name is McGehee. I get mispronunciations a 9 lot also. 10 (Exhibit 3 marked) 11 Q. (By Mr. McGehee) Okay. Let's mark this as 12 Exhibit 3, Colonel Zetterstrom. You've said before -- 13 and we have a copy of it. But you said, "If we don't 14 begin releasing now" -- and this was on August 28th -- 15 "the volume of uncontrolled water around the dams will 16 be higher and have a greater impact on the surrounding 17 communities." 18 Do you recall making that statement? 19 A. I do. 20 Q. And the surrounding communities you were 21 referring to -- and I'm gesturing now on Exhibit No. 1. 22 The surrounding communities were these communities at 23 the northern end of the dam, correct? 24 MR. SHAPIRO: Objection, been asked and 25 answered.</p>	<p style="text-align: right;">21</p> <p>1 A. Can you phrase your question differently, sir? 2 Q. Yeah. I might have used the wrong terms of 3 art. As I understand, there's a deviation, a standing 4 deviation in place during Hurricane Harvey that was 5 applied for and approved in 2016 that said the water 6 flow at Piney Point can exceed 2,000 CFS and can go up 7 to 3,000 CFS in certain situations and 4,000 CFS in 8 certain situations. Are you familiar with that? 9 A. Yes, sir. 10 Q. And it's my understanding -- and I'm asking you 11 a question -- did that deviation have anything to do 12 with the events of Hurricane Harvey once you activated 13 the induced surcharge protocol? 14 A. No, sir. 15 Q. Now, go with me. Let's assume that you 16 violated -- you didn't use the word "violate." 17 Let's assume that you didn't follow the 18 water control manual, and you kept the gates closed. 19 Are you with me? 20 A. Yes, sir. 21 Q. Tell the Judge a scenario where the 2016 22 deviation would have applied. What would have to happen 23 for that deviation to apply? 24 MR. SHAPIRO: Object to the form of the 25 question. It calls for speculation.</p>

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<p style="text-align: right;">26</p> <p>1 determining 4,000 feet per second?</p> <p>2 A. No, sir.</p> <p>3 Q. Is it fair to say globally that safety was a</p> <p>4 big concern when 4,000 feet per second was approved as a</p> <p>5 deviation?</p> <p>6 A. Can you define what you mean by the word</p> <p>7 "safety," sir.</p> <p>8 Q. Sure. That's fair. If we allow a combined</p> <p>9 flow at Piney Point of 4,000 feet per second, are we</p> <p>10 comfortable that we're not going to have collateral</p> <p>11 damage on Buffalo Bayou?</p> <p>12 MR. SHAPIRO: Object to the form of the</p> <p>13 question.</p> <p>14 A. I believe that 4,000 cubic feet per second was</p> <p>15 selected because that is a combined outflow that would</p> <p>16 not inundate structures downstream of Piney Point.</p> <p>17 Q. (By Mr. McGehee) Thank you, sir. As I struggle</p> <p>18 with my questions, I'm trying to find middle ground. I</p> <p>19 appreciate your cooperation.</p> <p>20 Let's go to the reason -- one of the</p> <p>21 reasons why the induced surcharge -- and I'm going to be</p> <p>22 back and forth here. One of the reasons why the induced</p> <p>23 surcharge protocol permits you to open the floodgates,</p> <p>24 one of the reasons I'm calling it is a public good.</p> <p>25 Now, I want to show you some quotes that you made; but</p>	<p style="text-align: right;">28</p> <p>1 A. Yes.</p> <p>2 Q. You're concerned about public safety and you're</p> <p>3 also concerned -- within public safety you're concerned</p> <p>4 about the safety of Downtown Houston and the Houston</p> <p>5 Ship Channel. So we have a quote here. I'll just ask</p> <p>6 you if you remember making this quote August 27. We</p> <p>7 have it if you don't. "These structures continue to</p> <p>8 perform as they were designed to do, which is to protect</p> <p>9 against flooding in Downtown Houston and the Houston</p> <p>10 Ship Channel." Fair enough?</p> <p>11 A. That is a quote that I made, sir.</p> <p>12 Q. Okay. Downtown Houston and Houston Ship</p> <p>13 Channel is part of the public safety that we just talked</p> <p>14 about?</p> <p>15 A. That refers to the authorized purpose of the</p> <p>16 structures.</p> <p>17 Q. And the induced surcharge has a public purpose</p> <p>18 associated with it also, correct?</p> <p>19 A. The surcharge is developed in consideration of</p> <p>20 the authorized purpose when they were constructed and</p> <p>21 authorized by Congress.</p> <p>22 Q. You know, a bunch of our properties down here</p> <p>23 were damaged. You know a bunch of our properties down</p> <p>24 here, at least all these test properties, were damaged</p> <p>25 during Hurricane Harvey. Fair enough?</p>
<p style="text-align: right;">27</p> <p>1 I'm going to come back to that and ask you to explain</p> <p>2 the public good.</p> <p>3 Have you said before in articles that --</p> <p>4 this is very obvious, and don't be offended. We have</p> <p>5 your articles. Have you said before in quotes what I've</p> <p>6 written up here on Exhibit No. 4?</p> <p>7 (Exhibit 4 marked)</p> <p>8 Q. (By Mr. McGehee) I'm going to mark that Exhibit</p> <p>9 No. 4. Have you said that public safety is our number</p> <p>10 one concern and you're working closely with the other</p> <p>11 partners to monitor the reservoirs?</p> <p>12 So public safety is a concern that helps</p> <p>13 justify the induced surcharge protocol. Fair enough?</p> <p>14 MR. SHAPIRO: Object to the form of the</p> <p>15 question. It's compound.</p> <p>16 A. Surcharge is justified for two reasons:</p> <p>17 optimizing storage capacity and ensuring the structural</p> <p>18 stability of the dams.</p> <p>19 Q. (By Mr. McGehee) Public safety fits into that</p> <p>20 definition, correct?</p> <p>21 A. I believe you're implying for the latter that</p> <p>22 the safety of the structures prevents -- or allows</p> <p>23 additional safety to the public.</p> <p>24 Q. And that's a fair, logical derivation. Do you</p> <p>25 agree?</p>	<p style="text-align: right;">29</p> <p>1 A. If you state those were damaged during</p> <p>2 Hurricane Harvey, I have not seen this product. I've</p> <p>3 seen the imagery but not these test locations.</p> <p>4 Q. Well, these are the test locations and these</p> <p>5 are the names of the test properties. I'll represent to</p> <p>6 you that these are the locations. And you agree -- and</p> <p>7 I'm gesturing now -- that properties along this Buffalo</p> <p>8 Bayou were inundated and damaged because of Hurricane</p> <p>9 Harvey?</p> <p>10 A. Because of Hurricane Harvey, yes, sir.</p> <p>11 Q. And because of the induced surcharge.</p> <p>12 MR. SHAPIRO: I'll object to the form of</p> <p>13 the question. It calls for expert analysis.</p> <p>14 A. I can't answer that question. I don't know --</p> <p>15 I do not know the answer to that question, sir.</p> <p>16 Q. (By Mr. McGehee) You don't know if the induced</p> <p>17 surcharge damaged properties?</p> <p>18 MR. SHAPIRO: Object to the form of the</p> <p>19 question. It's been asked and answered.</p> <p>20 A. I do not know that induced surcharge damaged</p> <p>21 these particular properties, sir.</p> <p>22 Q. (By Mr. McGehee) Fair enough. You do know that</p> <p>23 they damaged some properties?</p> <p>24 MR. SHAPIRO: Object to the form of the</p> <p>25 question, calls for expert analysis.</p>

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<p style="text-align: right;">30</p> <p>1 A. I do not know for sure, but I have been told 2 that there were damages due to the controlled releases 3 from the outlet structures. 4 Q. (By Mr. McGehee) And you modeled that, didn't 5 you? 6 A. There were models that were conducted that 7 showed the water impacts of the controlled releases. 8 Q. Fair enough. And you could foresee that there 9 was going to be damage if you started the induced 10 surcharge protocol? 11 A. It was understood that if we did the controlled 12 releases in surcharge conditions, that there would 13 potentially be impacts downstream. 14 MR. McGEHEE: Mark this as Exhibit No. 5. 15 (Exhibit 5 marked) 16 Q. (By Mr. McGehee) Let's talk about the dams. 17 Are you familiar with modeling that the Corps has done 18 that takes the dams out and models the natural 19 environment of this area without the dams and models 20 what would happen -- what would have happened during 21 Hurricane Harvey in the natural condition? Are you 22 familiar with the Corps' models? 23 A. No, sir. 24 Q. Are you familiar that the Corps has modeled 25 them; models do exist?</p>	<p style="text-align: right;">32</p> <p>1 an outline of where I want to go for the next period of 2 time; and we're going to have other blowups to talk 3 about these various entities. But I want to talk 4 generally about if there's no dam, how we model it if 5 there's no dam, what happens if there's no dam, who 6 might pay for anything that happens and if there's no 7 dam, what are the alternatives. Do you understand where 8 we're going with my questions? 9 MR. SHAPIRO: Before you respond, I mean, 10 I anticipate I'm going to have a fair number of 11 objections here, Jack, because this witness is obviously 12 not being presented as an expert on any of these issues 13 and is certainly not a modeler here at the Corps. But 14 you can ask whatever question -- 15 Q. (By Mr. McGehee) You own the Corps here, don't 16 you? The Corps of Engineers here in Galveston is yours. 17 True? 18 A. No, sir. 19 Q. You're the commander? 20 A. I am the commander. 21 Q. Do you wear green tabs? 22 A. I do not, sir. 23 Q. You're not considered a leader by the Army? 24 A. I am, sir. 25 Q. Under your leadership are all the military</p>
<p style="text-align: right;">31</p> <p>1 A. I have not seen them. I cannot confirm that 2 they exist. 3 Q. You don't know if the Corps has modeled natural 4 conditions versus conditions with the dam? 5 MR. SHAPIRO: Objection. That's been 6 asked and answered. 7 A. My knowledge is that those models were being 8 produced, but I do not know if they are complete. 9 Q. (By Mr. McGehee) Let's talk about in general 10 models without the dam, and let's talk about what you 11 know might have happened if there were no Addicks/Barker 12 dams. I want to talk about that. Okay? 13 A. Yes, sir. 14 Q. I want to go through an analysis of how you 15 would model a scenario where there would be no 16 Addicks/Barker dams. Okay? 17 A. Yes, sir. 18 Q. First let's talk about how you would model it. 19 Do you think it's fair to take -- 20 MR. SHAPIRO: Hey, Jack, I think your 21 colleague is trying to get your attention. 22 THE VIDEOGRAPHER: I'm having trouble 23 seeing it. 24 MR. McGEHEE: Okay. 25 Q. (By Mr. McGehee) Commander Zetterstrom, this is</p>	<p style="text-align: right;">33</p> <p>1 people assigned to the Galveston district? 2 A. I am the commander of the Galveston district. 3 Q. Under your command all the military people 4 assigned to the Galveston district are under your 5 control? 6 A. All of the personnel, sir. 7 Q. To include civilian personnel. True? 8 A. Yes, sir. 9 Q. To include Rob Thomas? 10 A. Yes, sir. 11 Q. This is where we're going. Do you understand 12 where we're going? 13 A. I understand the hypothetical questions that 14 you plan on proposing, sir. 15 Q. And thank you, Commander. These are 16 hypothetical. These are if there's no Addicks/Barker 17 dams. All my questions involving this board are going 18 to be hypothetical assuming there's no dams. Fair 19 enough? 20 A. Yes, sir. 21 Q. Now, I want to talk about best modeling. Not 22 best modeling from the guy that writes the model, that 23 writes the algorithms, that writes the algebra, that 24 writes the water flow ability and conclusions; but I 25 want to know the best model from a commander's</p>

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<p style="text-align: right;">34</p> <p>1 standpoint. Okay? And I think there's two kinds of</p> <p>2 models.</p> <p>3 We can go in and take the effects of</p> <p>4 Hurricane Harvey and in 2017 we can go, poof, no dams</p> <p>5 and eliminate the dams and let everything else be</p> <p>6 exactly the same. We could model a situation like that.</p> <p>7 True?</p> <p>8 MR. SHAPIRO: Object. That calls for</p> <p>9 expert analysis.</p> <p>10 A. Models can be reduced to be able to visualize</p> <p>11 the conditions that you described.</p> <p>12 Q. (By Mr. McGehee) And so we can model that</p> <p>13 condition that I just described -- I call them poof,</p> <p>14 they disappear. And in that I want you to assume</p> <p>15 70 years with no changes. In other words, we take the</p> <p>16 exact same situation in 2017 where this is empty,</p> <p>17 there's no homes built through here, where the Buffalo</p> <p>18 Bayou looks exactly the way it does today in 2018.</p> <p>19 There's no homes down here. There's no building code</p> <p>20 changes, nothing, just that there's no dams.</p> <p>21 We can model, poof, there's no dams; and</p> <p>22 we can assume no changes over a 70-year period. We can</p> <p>23 do that in a model, can't we?</p> <p>24 A. I believe you can.</p> <p>25 Q. And would you agree that to do it that way</p>	<p style="text-align: right;">36</p> <p>1 New Mexico, it can actually cause a hurricane in China.</p> <p>2 Would you agree that if we change</p> <p>3 something 70 years ago, there's likely going to be other</p> <p>4 changes that occur based on that single change?</p> <p>5 MR. SHAPIRO: Object to the form of the</p> <p>6 question, calls for speculation.</p> <p>7 A. I can't state or hypothesize what did or didn't</p> <p>8 occur in the past 70 years.</p> <p>9 Q. (By Mr. McGehee) Didn't ask that. I'm asking</p> <p>10 that you would assume lots of changes would occur if</p> <p>11 there was no dam built 70 years ago. Fair enough?</p> <p>12 MR. SHAPIRO: Object to the form of the</p> <p>13 question, calls for speculation.</p> <p>14 A. Again, I can't answer what level of</p> <p>15 developments may or may not have occurred had these</p> <p>16 structures not been constructed or what changes humans</p> <p>17 would have made to the environment in that time period.</p> <p>18 Q. (By Mr. McGehee) I didn't ask you what changes.</p> <p>19 I'm just asking you to agree that it's reasonable to</p> <p>20 assume that there would be changes over time had the</p> <p>21 dams never been built. Would you agree with that?</p> <p>22 MR. SHAPIRO: Object to the form of the</p> <p>23 question, calls for speculation.</p> <p>24 A. I think I would assume that if the dams were</p> <p>25 not built, that the amount of development that exists</p>
<p style="text-align: right;">35</p> <p>1 would be unreasonable?</p> <p>2 MR. SHAPIRO: Object to the form of the</p> <p>3 question. My specific objection includes the fact that</p> <p>4 I have no idea what you mean by "unreasonable."</p> <p>5 Q. (By Mr. McGehee) He's talking to the record.</p> <p>6 Don't listen to what he says. If he's talking to you,</p> <p>7 he's violating -- he's doing something wrong. Go ahead.</p> <p>8 A. So could you define what you mean by</p> <p>9 "reasonable," sir?</p> <p>10 Q. Sure. Let me compare it to the other model.</p> <p>11 And we're talking about how to do the best model, how to</p> <p>12 prepare the best model as a commander.</p> <p>13 The other way to do it is to go back</p> <p>14 70 years or go back 73 years and not have the dams built</p> <p>15 but let the natural flow of evolution, let the natural</p> <p>16 flow of history make the normal changes that would occur</p> <p>17 had we changed an event 70 years ago.</p> <p>18 When I was thinking about this, the</p> <p>19 butterfly effect came to mind. Are you familiar with</p> <p>20 the butterfly effect?</p> <p>21 A. I have seen the movie The Butterfly Effect.</p> <p>22 Q. Okay. And as I understand it, the butterfly</p> <p>23 effect is part of chaos theory. I don't know what that</p> <p>24 means. But the butterfly effect was written by some</p> <p>25 scientists that said if a butterfly flaps its wings in</p>	<p style="text-align: right;">37</p> <p>1 today would not have occurred.</p> <p>2 Q. (By Mr. McGehee) Okay. So changes would occur?</p> <p>3 MR. SHAPIRO: Object to the form of the</p> <p>4 question, calls for speculation.</p> <p>5 A. Change is the only thing constant in life.</p> <p>6 Q. (By Mr. McGehee) Okay. That's a good way to</p> <p>7 say it, and I don't mean to -- but if they were never</p> <p>8 built, you agree that it's reasonable to assume that</p> <p>9 changes over time would occur?</p> <p>10 MR. SHAPIRO: Object to the form of the</p> <p>11 question, calls for speculation.</p> <p>12 A. I believe it's reasonable to assume if they had</p> <p>13 not been built, the conditions that exist today would be</p> <p>14 different.</p> <p>15 Q. (By Mr. McGehee) Okay. Did I write anything</p> <p>16 improper after "they were never built"? Changes over</p> <p>17 time you believe are reasonable to assume?</p> <p>18 MR. SHAPIRO: Well, that misstates his</p> <p>19 testimony. He didn't use that term, "reasonable."</p> <p>20 Q. (By Mr. McGehee) He's talking to the record.</p> <p>21 Don't let him influence what you're going to say.</p> <p>22 MR. SHAPIRO: Object because it misstates</p> <p>23 his testimony.</p> <p>24 A. So to summarize that standpoint, I think there</p> <p>25 is more to my testimony than what's summarized in those</p>

10 (Pages 34 to 37)

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<p style="text-align: right;">154</p> <p>1 Do you see that?</p> <p>2 A. Yes, sir.</p> <p>3 Q. "We made them quicker than we would have</p> <p>4 preferred because the Addicks pool rose faster overnight</p> <p>5 than we had forecast and the pool threatened to disable</p> <p>6 power to the gates. We have a remote generator plan and</p> <p>7 a hand crank. Neither are as dependable as the main</p> <p>8 system. Even on the main system we have already had two</p> <p>9 temporary gate failures. That's why I decided to open</p> <p>10 gates on Addicks faster than we have done in the past.</p> <p>11 I was concerned that we would not be able to actuate the</p> <p>12 gates and that risk to our spillway was unacceptable."</p> <p>13 Do you see that?</p> <p>14 A. Yes, sir.</p> <p>15 Q. I've got several questions about this document.</p> <p>16 It says, "Even on the main system we have already had</p> <p>17 two temporary gate failures." Is that consistent with</p> <p>18 your recollection?</p> <p>19 A. I recall that there was some electrical issues</p> <p>20 that impacted the ability to raise and lower some of the</p> <p>21 gates.</p> <p>22 Q. And it goes on and says, "That's why I decided</p> <p>23 to open gates on Addicks faster than we have done in the</p> <p>24 past." When was the past?</p> <p>25 A. I don't know what he's referring to, sir.</p>	<p style="text-align: right;">156</p> <p>1 indicated that homes and structures would be inundated</p> <p>2 when the gates were opened prior to opening the gates,</p> <p>3 right?</p> <p>4 A. Yes.</p> <p>5 Q. Okay. So you knew that was going to occur. It</p> <p>6 appears to me that there are tradeoffs occurring here.</p> <p>7 And one is you can have uncontrolled releases going</p> <p>8 across the spillway that will impact some homes at least</p> <p>9 on the north end of Addicks or you can have water</p> <p>10 flowing down Buffalo Bayou that impacts homes downstream</p> <p>11 from Addicks and Barker. Do you see the tradeoff there?</p> <p>12 MR. SHAPIRO: Object to the form of the</p> <p>13 question. It's vague, and it's also compound.</p> <p>14 A. So I understand the dynamic between</p> <p>15 uncontrolled and controlled releases and the impacts</p> <p>16 either of those conditions could cause downstream as</p> <p>17 well as to the structures themselves.</p> <p>18 Q. (By Mr. Nolen) Well, is it fair to say that</p> <p>19 when we open the gates, when the Army Corps makes the</p> <p>20 decision to open the gates, that one of the reasons that</p> <p>21 those downstream homeowners' properties are being</p> <p>22 inundated is to, one, preserve the structural integrity</p> <p>23 of Addicks/Barker and, two, to benefit people on the</p> <p>24 north end of Addicks who would have had uncontrolled</p> <p>25 water going across the spillway?</p>
<p style="text-align: right;">155</p> <p>1 Q. Right. Because y'all had never had this</p> <p>2 situation before, right?</p> <p>3 A. Not to my knowledge, sir.</p> <p>4 Q. "I was concerned that we would not be able to</p> <p>5 actuate the gates and that risk to our spillway was</p> <p>6 unacceptable."</p> <p>7 Do you understand what that means?</p> <p>8 A. It means that if we had not done the faster</p> <p>9 releases and raised the gates quicker than what he's</p> <p>10 implying, that the likelihood of additional uncontrolled</p> <p>11 releases around the northern end of Addicks or of the</p> <p>12 spillways posed risk to the structures.</p> <p>13 Q. So let me ask you that because there's -- you</p> <p>14 have a situation where you're opening the gates and</p> <p>15 letting water out into Buffalo Bayou and it's going</p> <p>16 downstream and you know that it's going to impact</p> <p>17 property owners along Buffalo Bayou, correct?</p> <p>18 MR. SHAPIRO: Object to the form of the</p> <p>19 question, calls for speculation and expert testimony.</p> <p>20 It's also compound.</p> <p>21 A. So I believe in my earlier testimony you asked</p> <p>22 me and I answered that we were aware of the potential</p> <p>23 for inundation of structures downstream due to</p> <p>24 controlled releases.</p> <p>25 Q. (By Mr. Nolen) But you had mapping that</p>	<p style="text-align: right;">157</p> <p>1 MR. SHAPIRO: Object to the form of the</p> <p>2 question.</p> <p>3 A. Are you implying that in the decision-making</p> <p>4 there are other elements other than what I previously</p> <p>5 described to the purpose of surcharge?</p> <p>6 Q. (By Mr. Nolen) No. I'm not implying that.</p> <p>7 What I'm just asking, though, is is that when you have</p> <p>8 water going around and across the spillway, going around</p> <p>9 the north end of Addicks across the spillway, there</p> <p>10 would be people who would be impacted by that water</p> <p>11 flowing across the spillway; and those people benefit by</p> <p>12 opening the gates to let water go down Buffalo Bayou so</p> <p>13 that it stops going around in an uncontrolled manner</p> <p>14 across the spillway?</p> <p>15 MR. SHAPIRO: I object to the form of the</p> <p>16 question. That calls for speculation and assumes facts</p> <p>17 not in evidence. It also calls for an expert opinion.</p> <p>18 A. So based off of my understanding as a factual</p> <p>19 witness and information provided to me by my staff,</p> <p>20 there would be indirect benefits that you described.</p> <p>21 Q. (By Mr. Nolen) So if you leave the gate</p> <p>22 closed -- and you were asked about this by Mr. McGehee</p> <p>23 earlier. If you leave the gates closed, what you get is</p> <p>24 water going across the north end of Addicks across the</p> <p>25 spillway, correct?</p>

40 (Pages 154 to 157)

41 (Pages 158 to 161)

Colonel Lars Zetterstrom

<p style="text-align: right;">206</p> <p>1 you say?</p> <p>2 MR. EASTERBY: 115. We're going</p> <p>3 consecutively.</p> <p>4 MR. SHAPIRO: So this is following</p> <p>5 Thomas's?</p> <p>6 MR. EASTERBY: Thomas and then Johnson,</p> <p>7 Muic and then Heinley. So, anyway, it's 115.</p> <p>8 Q. (By Mr. Easterby) Colonel, I believe this is</p> <p>9 dated in or around September of 2016, although it does</p> <p>10 not have a date on it. I think we derived that from the</p> <p>11 file review.</p> <p>12 Are you familiar with this document that's</p> <p>13 been marked as Exhibit 115?</p> <p>14 A. I have not previously seen it, no, sir.</p> <p>15 Q. When you came here to Houston and assumed</p> <p>16 command, was there -- or were there any deviation</p> <p>17 approvals in place for Addicks and Barker?</p> <p>18 A. My understanding that when I took command was</p> <p>19 that we had an existing deviation approved for Addicks</p> <p>20 and Barker dam.</p> <p>21 Q. And could you just very briefly describe what</p> <p>22 that deviation approval was?</p> <p>23 A. So a summary of that deviation is that in</p> <p>24 certain conditions we had the authority to release up to</p> <p>25 4,000 cubic feet per second of combined outflows between</p>	<p style="text-align: right;">208</p> <p>1 Q. So did you explicitly request approval from him</p> <p>2 to do the induced surcharges on or about August 28th,</p> <p>3 2017?</p> <p>4 A. I did not ask for his approval. I informed him</p> <p>5 of what actions I intended on taking.</p> <p>6 Q. And he approved of those?</p> <p>7 A. He did not disapprove of them.</p> <p>8 Q. You heard some questions in your prior</p> <p>9 testimony about some of the flow that was going around</p> <p>10 the end of the northern portion of the Addicks</p> <p>11 embankment. Do you recall that?</p> <p>12 A. Yes, sir.</p> <p>13 Q. Is it correct that no impounded floodwater</p> <p>14 actually overtopped the auxiliary spillways anywhere in</p> <p>15 the Addicks and Barker embankments during or after</p> <p>16 Harvey?</p> <p>17 A. It is correct that no water flowed over the</p> <p>18 auxiliary spillways.</p> <p>19 Q. And no water overflowed any of the embankments,</p> <p>20 for that matter. Is that right?</p> <p>21 A. The dams were never overtopped.</p> <p>22 Q. So when the tax day event occurred, were you</p> <p>23 here in the office working as part of your transition?</p> <p>24 A. I was here in April. I don't recall the exact</p> <p>25 dates. I was here for a few days learning about the</p>
<p style="text-align: right;">207</p> <p>1 the Addicks and Barker outlet structures and any water</p> <p>2 that was in the Buffalo Bayou watershed downstream at</p> <p>3 the Piney Point gauge.</p> <p>4 Q. Understood. And I think maybe that 115 is</p> <p>5 speaking to what you just described. If you look at</p> <p>6 paragraph 3 of 115, General Objectives, it states in the</p> <p>7 third line that discharges greater than 4,000 CFS</p> <p>8 require authorization by the division engineer, correct?</p> <p>9 A. Yes, sir.</p> <p>10 Q. So during Harvey on or about August 28th, 2017</p> <p>11 did you obtain approval from the division engineer to</p> <p>12 initiate the induced surcharge releases?</p> <p>13 A. So the requirement is for a deviation from the</p> <p>14 water control manual. The water control manual, the way</p> <p>15 it's written, would allow and direct and recommend that</p> <p>16 the surcharge operations begin.</p> <p>17 Q. So you would not need to get a deviation</p> <p>18 approval for those induced surcharges because they're</p> <p>19 already approved in the water control manual?</p> <p>20 A. Yes, sir.</p> <p>21 Q. Putting that aside, did you seek or obtain</p> <p>22 approval anyway from Brigadier General Owen?</p> <p>23 A. I briefed my commander as to what we were going</p> <p>24 to do and made him aware of the necessary actions that</p> <p>25 we were going to take.</p>	<p style="text-align: right;">209</p> <p>1 Galveston district and our missions. As part of that I</p> <p>2 did see our EOC in operation and did visit the dams</p> <p>3 while they detained water due to the tax day flood.</p> <p>4 Q. So the EOC was in operation during the tax day</p> <p>5 event?</p> <p>6 A. Yes, sir.</p> <p>7 Q. Were there any induced surcharges during or</p> <p>8 after the tax day weather event relating to the Addicks</p> <p>9 and Barker dams and reservoirs to your knowledge?</p> <p>10 A. No, sir.</p> <p>11 Q. So the August 28th, 2017 induced surcharges,</p> <p>12 that was the first time that it happened in the life of</p> <p>13 these structures?</p> <p>14 A. Yes, sir.</p> <p>15 Q. Getting back to my prior questions about</p> <p>16 deviation approvals, have you ever been asked to grant</p> <p>17 deviation approvals since you assumed command back in</p> <p>18 July of 2016?</p> <p>19 A. I've never been asked to grant a deviation.</p> <p>20 Q. And are you conversant with the procedures and</p> <p>21 protocols for requesting and approving such deviations?</p> <p>22 A. I do not have the authority to approve a</p> <p>23 deviation. Under my responsibility my staff would</p> <p>24 request a deviation to southwestern division for</p> <p>25 approval by General Owen.</p>

53 (Pages 206 to 209)

Colonel Lars Zetterstrom

<p style="text-align: right;">214</p> <p>1 owned land?</p> <p>2 A. I understand that there was some amount of</p> <p>3 water that did leave government-owned land during the</p> <p>4 tax day flood.</p> <p>5 Q. Do you know when the Corps of Engineers first</p> <p>6 communicated to the public that it forecast impounded</p> <p>7 runoff would go off of government-owned land and into</p> <p>8 the privately owned upstream tracts that are adjacent to</p> <p>9 government-owned reservoir land?</p> <p>10 A. I do not.</p> <p>11 Q. Were you physically here in Houston or</p> <p>12 Galveston during the entire Harvey event?</p> <p>13 A. I was.</p> <p>14 Q. And were you in the Addicks field office</p> <p>15 between August 29th and September 1st?</p> <p>16 A. I deployed from this headquarters to the Barker</p> <p>17 dam office on the Monday after Hurricane Harvey made</p> <p>18 landfall. I don't recall the exact date.</p> <p>19 Q. Okay. I think Monday was the 28th. So you</p> <p>20 were there on-site for a few days, and then you came</p> <p>21 back to Galveston?</p> <p>22 A. I was on-site from that Monday, if it was the</p> <p>23 28th, until the following Friday.</p> <p>24 Q. So those five days or are you saying two weeks?</p> <p>25 A. I'm saying those five days.</p>	<p style="text-align: right;">216</p> <p>1 MR. EASTERBY: That really is a speaking</p> <p>2 objection, Bill.</p> <p>3 Q. (By Mr. Easterby) You can answer the question</p> <p>4 as I asked it.</p> <p>5 A. So the term "federal water" I don't know has an</p> <p>6 official meaning; but I believe that it implies that</p> <p>7 upon detention of water, that we are managing that</p> <p>8 water.</p> <p>9 Q. Sure. I mean, those embankments are there to</p> <p>10 hold back runoff that otherwise would flow downstream,</p> <p>11 right?</p> <p>12 A. Yes, sir.</p> <p>13 Q. And that's really the prescribed water</p> <p>14 management policy is to use those embankments to hold</p> <p>15 back runoff to mitigate against damaging flood stages</p> <p>16 for Downtown Houston and the Port of Houston, correct?</p> <p>17 A. Yes, sir.</p> <p>18 Q. Were you here when the construction project to</p> <p>19 install the new outlet structures commenced in 2016?</p> <p>20 A. The projects commenced prior to me assuming</p> <p>21 command, but I have been here through the entire period</p> <p>22 since assuming command for those construction projects.</p> <p>23 Q. And was the work to install those new outlets</p> <p>24 ongoing when Harvey made landfall on or about</p> <p>25 August 25th, 2017?</p>
<p style="text-align: right;">215</p> <p>1 Q. Understood.</p> <p>2 A. At the reservoir.</p> <p>3 Q. And after that did you come back here to</p> <p>4 Galveston, or did you go somewhere else?</p> <p>5 A. I came back here to Galveston, sir.</p> <p>6 Q. With respect to Exhibit 116, do you know if</p> <p>7 that is shared outside of the Corps of Engineers,</p> <p>8 meaning is that disseminated to Harris County Flood</p> <p>9 Control District or anybody else?</p> <p>10 A. I do not.</p> <p>11 Q. You don't know?</p> <p>12 A. No, sir.</p> <p>13 Q. In your prior testimony I think there were some</p> <p>14 questions and some responses about federal water. Do</p> <p>15 you recall that?</p> <p>16 A. Yes, sir.</p> <p>17 Q. And is it correct that the impounded runoff</p> <p>18 that is behind the Addicks and Barker embankments is</p> <p>19 federal water?</p> <p>20 MR. SHAPIRO: Well, I'll object. The term</p> <p>21 is vague.</p> <p>22 Q. (By Mr. Easterby) You can answer.</p> <p>23 MR. SHAPIRO: If you mean that the federal</p> <p>24 government owns it, then I object because it would call</p> <p>25 for a legal conclusion.</p>	<p style="text-align: right;">217</p> <p>1 A. Yes, sir.</p> <p>2 Q. And I'm sure the work had to be suspended</p> <p>3 because of that?</p> <p>4 A. Yes, sir.</p> <p>5 Q. Do you know when it recommenced roughly?</p> <p>6 A. I believe in October of 2017.</p> <p>7 Q. And do you have an understanding as to when</p> <p>8 it's supposed to be completed?</p> <p>9 A. Currently by the schedule it will be completed</p> <p>10 in April of 2020.</p> <p>11 Q. Other than that, are there any other approved</p> <p>12 modifications to the Addicks and Barker dams and</p> <p>13 reservoirs presently?</p> <p>14 A. No, sir.</p> <p>15 Q. And I believe you testified earlier about a</p> <p>16 study that is either being proposed or is underway. Do</p> <p>17 you recall that?</p> <p>18 A. Yes, sir.</p> <p>19 Q. Is it being proposed, or is it underway?</p> <p>20 A. It was authorized and appropriated by the</p> <p>21 Bipartisan Budget Act. We recently received funds, and</p> <p>22 actually I believe today was the first day that that</p> <p>23 study officially commenced.</p> <p>24 Q. Does the study have a name?</p> <p>25 A. It is called the Buffalo Bayou & Tributaries</p>

55 (Pages 214 to 217)

Colonel Lars Zetterstrom

<p style="text-align: right;">234</p> <p>1 something where an external news source or somebody</p> <p>2 posted this information and the Corps of Engineers</p> <p>3 caught it; or is this relating to the Corps of</p> <p>4 Engineers' own press release or its own news</p> <p>5 information?</p> <p>6 MR. SHAPIRO: Object to the form of the</p> <p>7 question. It's compound.</p> <p>8 A. This document in this format is for command and</p> <p>9 control purposes and providing information up the chain</p> <p>10 of command for their awareness.</p> <p>11 Q. (By Mr. Easterby) It says down here under</p> <p>12 Remarks, "Joint public release to media with our</p> <p>13 sponsor, Harris County Flood Control District." Do you</p> <p>14 see that?</p> <p>15 A. No, sir.</p> <p>16 Q. Right above Describe any Information Released</p> <p>17 to the Public?</p> <p>18 A. Yes, sir.</p> <p>19 Q. Then it says Describe any Information Released</p> <p>20 to the Public, correct?</p> <p>21 A. Yes, sir.</p> <p>22 Q. I'm assuming that's part of the actual form is</p> <p>23 to describe any information released to the public?</p> <p>24 A. The blue or purple are fields in the online</p> <p>25 database to be filled, and the black data is what was</p>	<p style="text-align: right;">236</p> <p>1 communicated to the public by Dr. Russo, would there</p> <p>2 have been a CCIR created in connection with that?</p> <p>3 A. I do not know.</p> <p>4 Q. So in the ENG -- you called it ENGLink?</p> <p>5 A. ENGLink.</p> <p>6 Q. ENGLink is, I'm guessing, some kind of platform</p> <p>7 that y'all have access to here at the Corps?</p> <p>8 A. Yes, sir.</p> <p>9 Q. And so you can go back if you want to and pull</p> <p>10 these kinds of reports for any time period around any</p> <p>11 topic?</p> <p>12 A. Yes, sir.</p> <p>13 Q. Okay.</p> <p>14 (Exhibit 120 marked)</p> <p>15 Q. (By Mr. Easterby) Let me hand you what's been</p> <p>16 marked Exhibit 120. 120 is an e-mail dated August 27th,</p> <p>17 2017 from Mario Beddingfield to a large distribution</p> <p>18 group copying you, correct?</p> <p>19 A. Yes, sir.</p> <p>20 Q. So if you look down, it appears that on</p> <p>21 August 27th, 2017 at 1:59 p.m. you sent an e-mail</p> <p>22 saying, "Final news release, for immediate release,"</p> <p>23 correct?</p> <p>24 A. Yes, sir.</p> <p>25 Q. At this time was it your customary practice to</p>
<p style="text-align: right;">235</p> <p>1 inputted by Mr. Brown.</p> <p>2 Q. Understood. So under the Describe Any</p> <p>3 Information field it says, "The following talking points</p> <p>4 are used." And then it has Addicks and Barker talking</p> <p>5 points dated August 27th, 2017, 1700 hours, correct?</p> <p>6 A. Yes, sir.</p> <p>7 Q. I haven't done an exact comparison of</p> <p>8 Exhibit 119's talking points in the prior exhibit, but</p> <p>9 it appears to me that Exhibit 119's talking points do</p> <p>10 not have the specific elevations contained in the prior</p> <p>11 exhibit. Do you see that?</p> <p>12 A. So are you saying that the talking points here</p> <p>13 do not have the same information as this?</p> <p>14 Q. That's exactly what I'm saying.</p> <p>15 A. So I would agree with that assessment, sir. I</p> <p>16 would have to look at the date/time of this SIR compared</p> <p>17 to the one in this document.</p> <p>18 Q. Right. Well, to be fair, the talking points</p> <p>19 that are summarized in Exhibit 119 appear to relate to a</p> <p>20 different date than the prior exhibit did on</p> <p>21 August 27th; and 118 is August 26th, correct?</p> <p>22 A. Yes, sir.</p> <p>23 Q. Okay. So let me ask you this question,</p> <p>24 Colonel. As you testified previously, if the talking</p> <p>25 points that are in Exhibit 118 had been transparently</p>	<p style="text-align: right;">237</p> <p>1 approve all the news releases that went out from this</p> <p>2 district?</p> <p>3 A. Yes. I reviewed -- to my knowledge and</p> <p>4 recollection, I reviewed all press releases during</p> <p>5 Hurricane Harvey.</p> <p>6 Q. And all those press releases contained accurate</p> <p>7 information?</p> <p>8 A. Yes.</p> <p>9 MR. SHAPIRO: Counsel, what are we doing</p> <p>10 here? This is at least the third time during this</p> <p>11 deposition we've seen this news release. Can we --</p> <p>12 MR. EASTERBY: Have I asked him a single</p> <p>13 question about that news release before now? Have I?</p> <p>14 MR. SHAPIRO: Well, it came up twice in</p> <p>15 the downstream discussion first as a blowup.</p> <p>16 MR. EASTERBY: I'm not going to debate</p> <p>17 with you. Just be mindful that we have separate cases</p> <p>18 with separate judges, and so I have to make a record. I</p> <p>19 can't rely on the prior testimony for my case in all</p> <p>20 extents and purposes. All right?</p> <p>21 MR. SHAPIRO: I don't know what that</p> <p>22 means. We're coordinating discovery here. All I'm</p> <p>23 saying is it's nearly 6:00, and this is the third time</p> <p>24 we have seen this news release.</p> <p>25 MR. EASTERBY: You've literally spent more</p>

60 (Pages 234 to 237)

Colonel Lars Zetterstrom

<p style="text-align: right;">238</p> <p>1 time talking about it than I did. 2 (Exhibit 121 marked) 3 Q. (By Mr. Easterby) Let me hand you what's been 4 marked as Exhibit 121. 121 is an e-mail dated 5 August 28th, 2017 from Mario Beddingfield to a large 6 distribution group talking about beginning the releases. 7 So it says that we will start with Barker 8 first. Rate of rise has increased dramatically in the 9 last few hours. Do you see that? 10 A. Yes, sir. 11 Q. And do you recall whether or not you received 12 this e-mail that is Exhibit 121? 13 A. I'm not in the distribution list. I do not 14 recall receiving it, no. 15 Q. So were you directly involved in the decision 16 to make the surcharge releases in the early-morning 17 hours of August 28th? 18 A. Yes. 19 Q. Just very briefly can you just tell us about 20 that? Was it midnight, 12:30 in the morning and you got 21 a phone call? Just walk me through what happened. 22 A. My recollection is that we had discussed this 23 the evening earlier, the evening of the day prior, that 24 there would be the likelihood for releases and what 25 conditions those releases would be appropriate. And</p>	<p style="text-align: right;">240</p> <p>1 Q. So to know the information that's ascribed to 2 you here, you would have to know what the amount of 3 inflows to the reservoirs were, correct? 4 A. Yes, sir. 5 Q. And is it correct that but for the Addicks and 6 Barker embankments, according to this anyway, during tax 7 day there would have been 132,853 cubic feet per second 8 going downstream unimpeded? 9 A. Yes, sir. 10 Q. And the embankments held all that water back? 11 A. Yes, sir. 12 Q. Do you have any idea how the Corps of Engineers 13 calculates the inflows to the Addicks and Barker 14 reservoirs? 15 A. I have an idea, yes, sir. 16 Q. You're a professional engineer, correct? 17 A. Yes, sir. 18 Q. You're licensed in Missouri? 19 A. Yes, sir. 20 Q. And do you have any education, training, 21 experience in hydrology and hydraulics? 22 A. During my bachelor's degree curriculum I 23 studied hydrology and hydraulics. 24 Q. Okay. So why don't you tell us briefly what is 25 your understanding of how the Corps of Engineers</p>
<p style="text-align: right;">239</p> <p>1 this is a notification that those conditions had been 2 reached. 3 Q. And those conditions would be the prescribed 4 conditions in the 2012 water control manual? 5 A. Yes, sir. 6 (Exhibit 122 marked) 7 Q. (By Mr. Easterby) Okay. Let me hand you what's 8 been marked as Exhibit 122. 122 is an August 28, 2017 9 press release No. 17031, and I believe that you had some 10 prior questions about this. 11 I want to direct your attention to the 12 second page of this exhibit, first paragraph that says, 13 "'This flood event will exceed the 2016 tax day flood 14 elevations,' Zetterstrom said. 'During the 2016 tax day 15 flood Addicks and Barker dams reduced Buffalo Bayou's 16 peak discharge from 132,853 CFS to 7,160 CFS.'" 17 Do you see that? 18 A. Yes, sir. 19 Q. Do you know where the information came from for 20 that quote that's ascribed to you? 21 A. I do not. 22 Q. Do you know if it's accurate? 23 A. I believe it to be accurate, and my assumption 24 is that this was from previous modeling from the tax day 25 storm.</p>	<p style="text-align: right;">241</p> <p>1 calculates what inflows are to the Addicks and Barker 2 reservoirs? 3 A. So, generally speaking, they would take 4 rainfall that was measured to have fallen in the 5 upstream rain gauges and input that data into models 6 that exist for Addicks and Barker dams and use that data 7 to determine the inflows of water into the reservoirs. 8 Q. Is it correct that there are not gauges on all 9 of the tributaries that come into the Addicks and Barker 10 reservoirs from the Addicks and Barker watersheds? 11 A. I do not know. 12 Q. And who do you think at the Corps of Engineers 13 would have the most knowledge on that topic, that topic 14 being the amount of inflows that go into Addicks and 15 Barker? 16 A. That would be Mr. Rob Thomas. 17 (Exhibit 123 marked) 18 Q. (By Mr. Easterby) Okay. Let me hand you 19 Exhibit 123. 20 MR. EASTERBY: This is the one you 21 retained a copy of, Bill, earlier. 22 Q. (By Mr. Easterby) 123 is an August 28, 2017 23 situation report details No. 6, correct? 24 A. Yes, sir. 25 Q. And so it's your testimony that you don't</p>

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IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM ADDICKS AND
BARKER (TEXAS) FLOOD-CONTROL
RESERVOIRS

Sub-Master Docket No. 17-cv-9002L

Judge Susan G. Braden

THIS DOCUMENT RELATES TO:

ALL DOWNSTREAM CASES

**THE UNITED STATES' DESIGNATION OF WITNESSES AND OBJECTIONS TO
DOWNSTREAM PLAINTIFFS' RCFC 30(b)(6) AMENDED NOTICE**

The United States hereby formally serves the following Designation of Witnesses and Objections to Downstream Plaintiffs' amended notice to take deposition of the United States Army Corps of Engineers pursuant to Rule 30(b)(6) ("30(b)(6) Amended Notice"). This Response largely repeats the United States' draft designations and objections that were filed on July 11, 2018 in response to both upstream and downstream plaintiffs' RCFC 30(b)(6) deposition notices (see ECF No. 127-1), in the context of Plaintiff's current 30(b)(6) Amended Notice.

The United States designates the listed witnesses subject to the objections interposed below. The persons designated will testify to the topics to which they have been assigned. Downstream Plaintiffs' 30(b)(6) Amended Notice specifies that it applies only to the United States Army Corps of Engineers. Accordingly, the United States has not designated a witness to provide testimony concerning other agencies' policies, practices, or information concerning the listed topics. The United States reserves the right to present evidence during the case about data, information, documents, policies, practices, or acts of federal government agencies other than the United States Army Corps of Engineers concerning the listed topics.



The United States' witnesses will not offer legal opinions or conclusions.

The deposition is not a Rule 30(b)(1) deposition, so the United States' designees are not to be questioned in their personal capacities about factual knowledge relevant to matters in this litigation. Nor are they tendered to offer expert opinions. With those premises and as further specified below, the United States designates the following individuals to testify to the matters as set forth below based on information known or reasonably available.

GENERAL OBJECTIONS

The United States objects to any topics requesting testimony "including but not limited to" other non-specified topics and will produce the below-listed personnel only on the topics specifically enumerated in reasonable particularity in the deposition notice.

The United States objects to any topics including the term "Addicks Reservoir," "Barker Reservoir," or "Addicks Barker Dams and Reservoirs." These terms are not defined in Plaintiffs' 30(b)(6) Amended Notice, and these terms, as defined in the upstream Plaintiffs' RCFC 30(b)(6) deposition notice, are inconsistent with the ordinary usage of the United States Army Corps of Engineers and therefore creates the possibility of confusion. The fact that downstream Plaintiffs have not defined these terms creates a greater likelihood of confusion. The United States will object if these terms are not defined at deposition.

DESIGNATION OF WITNESSES AND SPECIFIC OBJECTIONS

- 1. The organizational structure and chain of command for the USACE's maintenance and operation of the Barker and Addicks reservoirs and dams on August 27, 2017.*

The United States designates Robert Thomas.

- 2. The organizational structure and chain of command for the USACE's maintenance and operation of the Barker and Addicks reservoirs and dams from 2012 to August 27, 2017.*

The United States designates Robert Thomas.

3. *The organizational structure and chain of command for the USACE's maintenance and operation of the Barker and Addicks reservoirs and dams at all times since August 27, 2017.*

The United States designates Robert Thomas.

4. *The general history of the Barker and Addicks reservoirs and dams including their initial construction, the installation of gates, raising of the embankment, addition of concrete spillways, upgrades to the gate structure, and revisions to operations procedures (including Water Control Manuals) by the USACE since inception.*

The United States designates Robert Thomas.

5. *The existence, nature, methodology, and extent, of any hydrologic research and modeling conducted by USACE employees, including but not limited to the MMC Production Center, that was conducted from 2012 to August 27, 2017 related to the Barker and Addicks reservoirs and dams, downstream water flow, and projected resulting property loss or damage.*

The United States designates Robert Thomas to provide testimony only with respect to then-existing modeling done and documented by the United States Army Corps of Engineers concerning the extent and effect of inundation related to the Barker and Addicks dams and downstream water flows.

6. *The existence, nature, methodology, and extent of any hydrologic research and modeling conducted by USACE employees, including but not limited to the MMC Production Center, that was conducted from August 27, 2017 to the present related to the Barker and Addicks reservoirs and dams, downstream water flow, and projected resulting property loss or damage.*

The United States designates Robert Thomas to provide testimony only with respect to pre-litigation modeling (or any modeling or analysis done not at the request of counsel) by the United States Army Corps of Engineers concerning the extent and effect of inundation related to the Barker and Addicks dams and downstream water flows.

7. *The identities of USACE division, employees, agents, and/or third-party contractors who were involved in any way in the creation of any and all USACE documents being produced in this litigation by the Defendant.*

The United States objects to the request as overbroad, unduly burdensome, and lacking reasonable particularity as it purports to require knowledge and testimony about the authors, consultants, and reviewers of thousands of documents spanning more than 70 years.

8. *The employment history and employment file of United States Army Corp of Engineers' employee Richard Long.*

The United States objects to this request as duplicative of Plaintiffs' prior requests and inappropriate for a RCFC 30(b)(6) deposition notice. Plaintiffs have already deposed Richard Long in his individual capacity.

9. *Person(s) knowledgeable regarding the design and construction of the Addicks Reservoir and Barker Reservoir, including but not limited to knowledge regarding:*

The United States objects to the request for testimony about the design and construction of the Addicks and Barker dams, "including but not limited to" any topics not specified in Plaintiffs' 30(b)(6) Amended Notice as lacking reasonable particularity required for the United States to designate and prepare a witness for testimony. The United States also objects to the request as vague because it is unclear whether Plaintiffs seek testimony about persons knowledgeable about the listed subjects, or testimony about the substantive information listed—i.e. design and construction of the dams.

a. *Specific areas of Houston that the reservoirs were intended to protect;*

The United States designates Robert Thomas.

b. *Modeling or other data reflecting—at the time of construction—the extent to which the reservoirs were designed to protect those areas, and any future development in those areas.*

The United States designates Robert Thomas.

10. *Person(s) knowledgeable regarding maintenance of the Addicks Reservoir and Barker Reservoir, including but not limited to knowledge regarding:*

The United States objects to the request as overbroad and lacking reasonable particularity as it purports to require knowledge and testimony about any and all maintenance and the condition of projects that have been in existence for 70 years. The United States objects to the request for testimony about maintenance of the Addicks and Barker dams, "including but not limited to" any topics not specified in Plaintiffs' 30(b)(6) Amended Notice as lacking reasonable particularity required for the United States to designate and prepare a witness for testimony. The United States also objects to the request as vague because it is unclear whether Plaintiffs seek testimony about persons knowledgeable about the listed subjects, or testimony about the substantive information listed—i.e. maintenance of the dams.

a. *Monitoring of the condition of the reservoirs from 2012 through September 26, 2017;*

The United States designates Robert Thomas.

b. *Regular maintenance on the dams, gates, etc. from 2012 through August 27, 2017;*

The United States designates Robert Thomas.

- c. Maintenance projects sought by the Corps that were not completed, and the reason for any such non-completion from 2012 through August 27, 2017; and*

The United States objects to the request as lacking reasonable particularity as it provides no details with respect to the types of maintenance projects about which testimony is desired and purports to require knowledge and testimony about potential dam maintenance projects of an unspecified nature. Subject to and without waiving the objection, the United States designates Robert Thomas to testify about structural or operational changes analyzed or documented by the United States Army Corps of Engineers.

- d. Concerns about declining or deteriorating condition of any parts of the reservoirs from 2012 through September 26, 2017.*

The United States designates Robert Thomas.

- 11. Person(s) knowledgeable regarding improvements that were planned, considered, or implemented by the United States, its agents and/or representatives for the Addicks Reservoir and Barker Reservoir, including but not limited to knowledge regarding:*

The United States objects to the request for testimony about unspecified improvements of the Addicks and Barker dams, “including but not limited to” any topics not specified in Plaintiffs’ 30(b)(6) Amended Notice as lacking reasonable particularity required for the United States to designate and prepare a witness for testimony. The United States also objects to the request as vague because it is unclear whether Plaintiffs seek testimony about persons knowledgeable about the listed subjects, or testimony about the substantive information listed—i.e. installation of the gates and recommended improvements.

- a. Installation of gates throughout the history of the reservoirs and how that changed the plans for operation of the reservoirs, their capacity, and the effects relating to inundation or potential for inundation on land downstream of the reservoirs falling within the stated “flood risk management protection” areas described in Section 2-02 of the November, 3 2012 Water Control Manual, which states that “Addicks and Barker Reservoirs contribute to the overall purposes of authorized Buffalo Bayou flood risk management projects, which include the flood risk management protection provided to the City of Houston from flood damages, and prevention of excessive velocities and silt deposits (sic) in the Houston Ship Channel Turning Basin. The two reservoirs provide floodwater detention for flood risk management on the Buffalo Bayou watershed . . .”; and*

The United States objects to the portion of the request seeking testimony on “effects relating to inundation or potential for inundation” as overbroad and lacking reasonable particularity as it purports to require knowledge and testimony about how the gates actually affected flows downstream during every time the dams were used in their 70-year history. The United States further objects to any request for opinion testimony concerning “effects related to . . . potential for inundation.” Subject to and without waiving the objections, the United States designates Robert Thomas to provide testimony only on the Corps’ historic installation of gates and changes in Addicks and Barker reservoir operation plans pertaining to use of the gates and the reservoir

capacities, documented statements of the United States Corps of Engineers concerning the potential for inundation resulting from changes in operational plans, and the actual operation of the gates during major flood events.

- b. Recommended improvements to the reservoirs made, considered, or accepted by the United States, its agents and/or representatives, that have not been completed from 2012 through August 27, 2017, and the reasons for any such non-completion;*

The United States objects to the request because information about improvements not actually completed is irrelevant to the claims or defenses in the case and the expected burden of discovery outweighs its likely benefit. Subject to and without waiving the objection, the United States designates Robert Thomas to testify about improvements to the reservoirs that were analyzed or documented by the United States Army Corps of Engineers from 2012 and August 27, 2017.

- 12. Person(s) knowledgeable regarding operation of the Addicks Reservoir and Barker Reservoir generally, including but not limited to knowledge regarding:*

The United States objects to the request for testimony about the Addicks and Barker Reservoir operations, “including but not limited to” any topics not specified in the Notice as lacking reasonable particularity required for the United States to designate and prepare a witness for testimony. The United States also objects to the request as vague because it is unclear whether Plaintiffs seek testimony about persons knowledgeable about the listed subjects, or testimony about the substantive information listed—i.e. operation of the dams.

- a. Policies for releases of water from the reservoirs from 2012 through the present, including changes to such policies over time and the reasons for any such policy changes;*

The United States designates Robert Thomas.

- b. The history of any releases of water from the reservoirs from 2012 and prior to August 28, 2017;*

The United States designates Robert Thomas.

- c. Processes for requesting deviations from policies regarding releases of water from the reservoirs from 2012 through the present;*

The United States designates Robert Thomas.

- d. Processes for monitoring releases of water and the effects on Buffalo Bayou and properties downstream from the reservoirs from 2012 through the present;*

The United States objects to the request for testimony about properties at unspecified distances from the Addicks and Barker dams. The United States further objects to the request as overbroad, unduly burdensome, and lacking reasonable particularity because it is not limited to

monitoring performed by the federal government. Subject to and without waiving the objections, the United States designates Robert Thomas to provide testimony only concerning processes of the United States Army Corps of Engineers from 2012 to the Present for monitoring both releases of water from Addicks and Barker dams and downstream extents of inundation.

- e. Any hydrological or other modeling performed to determine the scope and extent of any anticipated flooding to downstream properties falling within the stated "flood risk management protection" areas described in Section 2-02 of the November, 2012 Water Control Manual, as further described in 11(a) above, from operation or anticipated operation of the reservoirs from 2012 and prior to August 15, 2017; and*

The United States objects to the request as overbroad and lacking reasonable particularity as it purports to require knowledge and testimony about hydrological or other modeling performed by unspecified persons or entities. Subject to and without waiving the objection, the United States designates Robert Thomas to provide testimony only on the United States Army Corps of Engineers' modeling of potential flooding downstream of the Addicks and Barker reservoirs conducted from 2012 to August 15, 2017.

- f. Plans, modeling, or other information—from 2012 through the present, created by or at the request of the United States, its agents and/or representatives, or relied upon by the United States, its agents and/or representatives, with respect to its operation of the Addicks and Barker Reservoirs—regarding conditions that could cause a failure of the reservoirs, and any actions or efforts to prevent such failure.*

The United States designates Robert Thomas.

- 13. Person(s) knowledgeable regarding the operation of the Addicks Reservoir and Barker Reservoir for the period spanning August 15, 2017 to September 26, 2017, including but not limited to knowledge regarding:*

The United States objects to the request for testimony about the dams, "including but not limited to" any topics not specified in the Notice as lacking reasonable particularity required for the United States to designate and prepare a witness for testimony. The United States also objects to the request as vague because it is unclear whether Plaintiffs seek testimony about persons knowledgeable about the listed subjects, or testimony about the substantive information listed—i.e. operation of the dams during August and September 2017.

- a. When and why the decision was made to open reservoir gates beginning on or about August 28, 2017, and any subsequent decisions to further open reservoir gates thereafter; and*

The United States designates Robert Thomas to provide testimony only concerning the United States Army Corps of Engineers' decision-making regarding opening the Addicks and Barker gates on or around August 28, 2017 and days thereafter.

- b. Any hydrological or other modeling performed to determine the scope and extent of any anticipated flooding to downstream properties from operation or anticipated operation of the reservoirs during the period spanning August 15, 2017 to September 26, 2017.*

The United States objects to the request for testimony not limited to hydrologic or other modeling requested or performed by the federal government. Subject to and without waiting the objection, the United States designates Robert Thomas to provide testimony about the United States Army Corps of Engineers' modeling concerning the extent of inundation downstream of the Addicks and Barker dams resulting from Hurricane Harvey during August and September 2017.

- 14. Person(s) knowledgeable regarding communicating information to the public, to Houston or other local officials, to any United States official or employee, or to any neighborhood or members of a neighborhood concerning the Addicks and Barker Reservoirs for the period spanning August 15, 2017 to September 26, 2017, including but not limited to knowledge regarding:*

The United States objects to the request for testimony about the dams, "including but not limited to" any topics not specified in the Notice as lacking reasonable particularity required for the United States to designate and prepare a witness for testimony. The United States also objects to the request as vague because it is unclear whether Plaintiffs seek testimony about persons knowledgeable about the listed subjects, or testimony about the substantive information listed—i.e. communications to the public.

- a. When information was communicated about the Addicks and Barker dams, and why information was or was not communicated at a particular time; and*

The United States objects to the request for testimony about communications not limited to those from the federal government. Subject to and without waiving the objection, the United States designates Robert Thomas to provide testimony about communications from the United States Army Corps of Engineers to local government officials and otherwise via official agency communications.

- b. Any methods of communication, including, but not limited to, by phone, email, text, fax, hard-copy distribution, social media communication, inperson communication, or any other method that the United States Government used to communicate with its citizens during the period spanning August 15, 2017 to September 26, 2017.*

The United States objects to the request as vague because it is unclear whether the request seeks testimony concerning the methods of communication or the messages conveyed. The United States interprets the request to pertain only to methods of communication, and given that understanding, designates Robert Thomas.

15. *Person(s) knowledgeable about the “regulatory floodway”¹ and surrounding “flood hazard areas” or “special flood hazard areas”² along Buffalo Bayou, including any changes to the Bayou’s elevation or contour, and any hydrological knowledge about Buffalo Bayou’s water flow from 2012 to August 28, 2017, to the extent the United States relies upon or utilizes such knowledge in its operation of the Addicks and Barker Reservoirs pursuant to the November 2012 Water Control Manual.*

The United States objects to the request as vague because it is unclear whether Plaintiffs seek testimony about persons knowledgeable about the listed subjects, or testimony about the substantive information listed—i.e. design and construction of the dams.

16. *Person(s) knowledgeable about the USGS Stream Gauges and flood monitoring systems within the Addicks Reservoir and Barker Reservoir and along the Buffalo Bayou, including but not limited to knowledge regarding:*

The United States objects to the request for testimony about the stream gages and monitoring “including but not limited to” any topics not specified in the Notice as lacking reasonable particularity required for the United States to designate and prepare a witness for testimony. The United States also objects to the request as vague because it is unclear whether Plaintiffs seek testimony about persons knowledgeable about the listed subjects, or testimony about the substantive information listed—i.e. USGS gages and flood monitoring systems.

- a. How the gauges are monitored, operated, maintained, improved, designed, or constructed from 2012 to August 28, 2017;*

The United States designates Jeffery East of the United States Geological Survey, located in Conroe, Texas to provide testimony about contemporary monitoring, operations, maintenance, and construction of USGS stream gages within the Addicks Reservoir and Barker Reservoir and along the Buffalo Bayou.

- b. The functionality of the gauges during the period spanning August 15, 2017 to September 26, 2017; and*

The United States designates Jeffery East.

- c. The purpose of the gauges, where the gauge data is sent, and what any person in the United States Government does with the data.*

The United States objects to the request as overbroad and not reasonably particular because it seeks testimony about what any of many agencies or personnel within the federal government do with collected data. The United States designates Jeffery East to provide testimony only concerning USGS’s purposes with respect to the stream gages and where and how USGS stores and makes public the data collected therefrom.

¹ See <https://www.fema.gov/floodway>

² See <https://www.fema.gov/flood-zones>

Dated: August 30, 2018

Respectfully submitted,

JEFFREY H. WOOD
Acting Assistant Attorney General
Environment & Natural Resources Division

By /s/ Kristine Tardiff
WILLIAM J. SHAPIRO
KRISTINE TARDIFF
LAURA W. DUNCAN
SARAH IZFAR
JESSICA HELD
DANIEL W. DOOHER
BRADLEY L. LEVINE
DAVID DAIN
MAYTE SANTACRUZ
Trial Attorneys
United States Department of Justice
Environment & Natural Resources Division
Post Office Box 7611
Washington, D.C. 20044-7611
Tel: (202) 305-0481
Fax: (202) 305-0506
E-mail: william.shapiro@usdoj.gov

CERTIFICATE OF SERVICE

I hereby certify that on this 30th day of August 2018, a true and correct copy of the foregoing document was served upon the following individuals electronically via e-mail and by FedEx:

Daniel Charest, Esq. – Upstream Plaintiffs
900 Jackson Street
Suite 500
Dallas, Texas 75202

Rand Nolen, Esq. – Downstream Plaintiffs
2800 Post Oak Boulevard
Suite 4000
Houston, Texas 77056

/s/ Kristine Tardiff
KRISTINE TARDIFF
Trial Attorney
Natural Resources Section

From: Kauffman, Michael G CIV USARMY CESWG (US) </O=USACE EXCHANGE/OU=SWD ADMIN GROUP/CN=RECIPIENTS/CN=M3ODXMGK>
To: Sterling, Michael C CIV USARMY CESWD (US)
CC: Thomas, Robert C III CIV USARMY CESWG (US); Maglio, Coraggio K CIV USARMY CESWG (US); Scheffler, Charles Jr CIV USARMY CESWG (US); Beddingfield, Mario CIV (US); Clarkin, Timothy J CIV USARMY CESWG (US); Garske, Michael L CIV USARMY CESWG (US)
Sent: 9/20/2017 5:43:04 PM
Subject: Reservoir Contribution to Bayou Flow
Attachments: FlowPercentages.xlsx

Dr. Sterling,

This email is in response to the phone conversation that we had on 19 September. You asked me to look at what percentage of the flow in the bayou was a result of reservoir discharges.

The attached spreadsheet consists of flow data extracted from the USGS website and reservoir outflow calculated with our rating curves.

Dairy Ashford (USGS 08073500 Buffalo Bayou nr Addicks, TX),
 West Belt (USGS 08073600 Buffalo Bayou at W Belt Dr, Houston, TX), and
 Piney Point (USGS 08073700 Buffalo Bayou at Piney Point, TX)
 are the gauges used for comparison.

Normally flows will take 3-4 hours to reach West Belt and 8 hours to reach Piney Point. Because of the magnitude of the flows in the bayou, I have assumed 3 hours to Dairy Ashford, 7 hours to West Belt, and 16 hours to Piney Point.

So columns K-P reflect those reservoir outflows lagged to compensate for that travel time. So for example, we started releases from the reservoir at 0100, 28 August.

That flow showed up at Dairy Ashford at 0400, at West Belt at 0800, and at Piney Point at 1700 on 28 August

Columns R-T reflect what percent of the flow at those locations could be attributed to the reservoir outflows at that time (Column A).

Michael Kauffman
 Hydrology & Hydraulics
 U.S. Army Corps of Engineers Galveston District
 Phone: 409-766-3104

Web: <http://www.swg.usace.army.mil>
 Facebook: <http://www.facebook.com/GalvestonDistrict>
 DVIDS: <http://www.dvidshub.net/units/USACE-GD>
 Twitter: <http://www.twitter.com/usacegalveston>
 LinkedIn: <http://www.linkedin.com/company/3517332>



USACE006089

	Addicks Reservoir Discharge (cfs)	Barker Reservoir Discharge (cfs)	Stnd Calc		Submerged Release Calc		gauge readings			Reservoir Outflow at Dairy Ashford flow (cfs)	Reservoir Outflow at West Belt flow (cfs)	Reservoir Outflow at PineyPoint flow (cfs)	Percent of Flow in the Bayou Standard Rating Curve Calcs		
			Total Reservoir Discharge (cfs)	Submerged Release Calc Total Reservoir Discharge (cfs)	Total Reservoir Discharge (cfs)	Submerged Release Calc Total Reservoir Discharge (cfs)	Dairy Ashford flow (cfs)	West Belt flow (cfs)	PineyPoint flow (cfs)	Dairy Ashford flow (cfs)	West Belt flow (cfs)	PineyPoint flow (cfs)	Dairy Ashford	West Belt	PineyPoint
27 Aug 17, 07:00	0	0	0				6,590	12,800	10,400				0%	0%	0%
27 Aug 17, 08:00	0	0	0				6,650	13,400	10,600				0%	0%	0%
27 Aug 17, 09:00	0	0	0				6,330	13,500	10,600				0%	0%	0%
27 Aug 17, 10:00	0	0	0				6,480	13,600	10,600				0%	0%	0%
27 Aug 17, 11:00	0	0	0				6,280	14,300	11,300				0%	0%	0%
27 Aug 17, 12:00	0	0	0				6,020	14,700	11,900				0%	0%	0%
27 Aug 17, 13:00	0	0	0				5,770	14,500	12,100				0%	0%	0%
27 Aug 17, 14:00	0	0	0				5,600	14,000	12,000		0		0%	0%	0%
27 Aug 17, 15:00	0	0	0				5,380	13,400	11,600		0		0%	0%	0%
27 Aug 17, 16:00	0	0	0				5,490	13,000	11,400		0		0%	0%	0%
27 Aug 17, 17:00	0	0	0				6,070	13,100	11,200		0		0%	0%	0%
27 Aug 17, 18:00	0	0	0				6,000	12,800	11,000		0		0%	0%	0%
27 Aug 17, 19:00	0	0	0				5,820	12,300	10,600		0		0%	0%	0%
27 Aug 17, 20:00	0	0	0				5,930	12,100	10,300		0		0%	0%	0%
27 Aug 17, 21:00	0	0	0				6,110	12,200	10,300		0		0%	0%	0%
27 Aug 17, 22:00	0	0	0				7,000	13,700	11,200		0		0%	0%	0%
27 Aug 17, 23:00	0	0	0				7,840	14,900	11,700		0	0	0%	0%	0%
27 Aug 17, 24:00	0	0	0				8,380	15,500	12,000		0	0	0%	0%	0%
28 Aug 17, 01:00	545	0	545				8,220	15,600	12,100		0	0	0%	0%	0%
28 Aug 17, 02:00	1341	22	1363				8,000	15,500	12,100		0	0	0%	0%	0%
28 Aug 17, 03:00	1101	1075	2175				7,830	15,100	11,900		0	0	0%	0%	0%
28 Aug 17, 04:00	1629	1586	3215				7,770	14,700	11,700		545	0	7%	0%	0%
28 Aug 17, 05:00	2101	1592	3693				7,720	14,500	11,600		1363	0	18%	0%	0%
28 Aug 17, 06:00	2632	2042	4675				7,950	14,200	11,400		2175	0	27%	0%	0%
28 Aug 17, 07:00	3116	2562	5678				8,080	13,800	11,100		3215	0	40%	0%	0%
28 Aug 17, 08:00	2645	3030	5675				8,300	13,400	10,700		3693	545	44%	4%	0%
28 Aug 17, 09:00	2653	2579	5232				8,510	13,200	10,500		4675	1363	55%	10%	0%
28 Aug 17, 10:00	2659	2585	5244				8,750	12,900	10,300		5678	2175	65%	17%	0%
28 Aug 17, 11:00	2665	2595	5260				8,930	13,000	10,300		5675	3215	64%	25%	0%
28 Aug 17, 12:00	2672	2604	5276				9,080	13,200	10,400		5232	3693	58%	28%	0%
28 Aug 17, 13:00	2682	2612	5294				9,240	13,500	10,600		5244	4675	57%	35%	0%
28 Aug 17, 14:00	2689	2621	5311				9,250	13,800	10,800		5260	5678	57%	41%	0%
28 Aug 17, 15:00	2697	2631	5328				9,590	14,000	11,100		5276	5675	55%	41%	0%
28 Aug 17, 16:00	2704	2878	5582				9,710	14,400	11,500		5294	5232	55%	36%	0%
28 Aug 17, 17:00	2713	2888	5600				9,800	14,900	12,000		5311	5244	54%	35%	5%
28 Aug 17, 18:00	2970	3136	6105				10,000	15,400	12,400		5328	5260	53%	34%	11%
28 Aug 17, 19:00	3229	3383	6612				10,100	15,600	12,600		5582	5276	55%	34%	17%
28 Aug 17, 20:00	3239	3393	6632				10,200	15,800	12,900		5600	5294	55%	34%	25%
28 Aug 17, 21:00	3249	3402	6651				10,300	16,000	13,000		6105	5311	59%	33%	28%
28 Aug 17, 22:00	3259	3410	6670				10,400	16,100	13,100		6612	5328	64%	33%	36%
28 Aug 17, 23:00	3268	3417	6685				10,400	16,100	13,200		6632	5582	64%	35%	43%
28 Aug 17, 24:00	3277	3423	6700				10,500	16,100	13,100		6651	5600	63%	35%	40%
29 Aug 17, 01:00	3285	3430	6715				10,500	16,100	13,200		6670	6105	64%	38%	40%
29 Aug 17, 02:00	3294	3436	6730				10,600	16,100	13,200		6685	6612	63%	41%	40%
29 Aug 17, 03:00	3303	3443	6746				10,600	16,100	13,200		6700	6632	63%	41%	40%
29 Aug 17, 04:00	3311	3449	6760				10,600	16,100	13,000		6715	6651	63%	41%	41%
29 Aug 17, 05:00	3318	3456	6774				10,500	16,100	12,900		6730	6670	64%	41%	41%

29 Aug 17, 06:00	3325	3462	6787	10,700	16,000	12,800	6746	6685	5311	63%	42%	41%
29 Aug 17, 07:00	3331	3711	7042	10,400	15,900	12,800	6760	6700	5328	65%	42%	42%
29 Aug 17, 08:00	3843	3714	7557	10,600	15,800	12,700	6774	6715	5582	64%	42%	44%
29 Aug 17, 09:00	3850	3959	7809	10,500	15,700	12,500	6787	6730	5600	65%	43%	45%
29 Aug 17, 10:00	4357	4201	8559	10,600	15,500	12,300	7042	6746	6105	66%	44%	50%
29 Aug 17, 11:00	4745	4204	8949	10,900	15,300	12,100	7557	6760	6612	69%	44%	55%
29 Aug 17, 12:00	5612	4659	10271	11,000	15,200	12,000	7809	6774	6632	71%	45%	55%
29 Aug 17, 13:00	6115	5160	11275	11,200	15,100	12,000	8559	6787	6651	76%	45%	55%
29 Aug 17, 14:00	7093	5629	12722	11,600	15,000	11,900	8949	7042	6670	77%	47%	56%
29 Aug 17, 15:00	7704	6096	13799	12,000	14,900	11,700	10271	7557	6685	86%	51%	57%
29 Aug 17, 16:00	7705	6099	13803	12,400	14,900	11,500	11275	7809	6700	91%	52%	58%
29 Aug 17, 17:00	7707	6330	14037	12,900	14,900	11,400	12722	8559	6715	99%	57%	59%
29 Aug 17, 18:00	7708	6332	14041	13,300	14,900	11,300	13799	8949	6730	100%	60%	60%
29 Aug 17, 19:00	7711	6336	14047	13,600	15,000	11,200	13803	10271	6746	100%	68%	60%
29 Aug 17, 20:00	7708	6336	14045	13,800	15,200	11,200	14037	11275	6760	100%	74%	60%
29 Aug 17, 21:00	7712	6336	14048	14,200	15,400	11,100	14041	12722	6774	99%	83%	61%
29 Aug 17, 22:00	7716	6339	14055	14,300	15,600	11,200	14047	13799	6787	98%	88%	61%
29 Aug 17, 23:00	7718	6340	14058	14,500	15,800	11,200	14045	13803	7042	97%	87%	63%
29 Aug 17, 24:00	7719	6340	14059	14,400	16,100	11,400	14048	14037	7557	98%	87%	66%
30 Aug 17, 01:00	7720	6340	14061	14,600	16,100	11,400	14055	14041	7809	96%	87%	68%
30 Aug 17, 02:00	7721	6341	14063	14,800	16,200	11,500	14058	14047	8559	95%	87%	74%
30 Aug 17, 03:00	7723	6342	14066	14,850	16,400	11,700	14059	14045	8949	95%	86%	76%
30 Aug 17, 04:00	7725	6341	14066	14,900	16,600	11,900	14061	14048	10271	94%	85%	86%
30 Aug 17, 05:00	7727	6342	14069	14,900	16,800	12,100	14063	14055	11275	94%	84%	93%
30 Aug 17, 06:00	7728	6343	14071	14,850	17,050	12,200	14066	14058	12722	95%	82%	100%
30 Aug 17, 07:00	7729	6342	14071	14,800	17,300	12,300	14066	14059	13799	95%	81%	100%
30 Aug 17, 08:00	7728	6341	14069	14,800	17,500	12,600	14069	14061	13803	95%	80%	100%
30 Aug 17, 09:00	7728	6340	14068	14,750	17,700	12,700	14071	14063	14037	95%	79%	100%
30 Aug 17, 10:00	7727	6339	14066	14,700	17,900	13,000	14071	14066	14041	96%	79%	100%
30 Aug 17, 11:00	7728	6337	14065	14,650	18,100	13,200	14069	14066	14047	96%	78%	100%
30 Aug 17, 12:00	7728	6337	14065	14,600	18,250	13,400	14068	14069	14045	96%	77%	100%
30 Aug 17, 13:00	7727	6337	14064	14,550	18,350	13,500	14066	14071	14048	97%	77%	100%
30 Aug 17, 14:00	7726	6334	14060	14,500	18,450	13,700	14065	14071	14055	97%	76%	100%
30 Aug 17, 15:00	7726	6334	14060	14,450	18,500	13,800	14065	14069	14058	97%	76%	100%
30 Aug 17, 16:00	7484	6332	13816	14,350	18,550	13,900	14064	14068	14059	98%	76%	100%
30 Aug 17, 17:00	7485	6330	13815	14,250		14,100	14060	14066	14061	99%		100%
30 Aug 17, 18:00	7363	6330	13693	14,200	18,600	14,200	14060	14065	14063	99%	76%	99%
30 Aug 17, 19:00	7243	6331	13574	14,300	18,700	14,200	13816	14065	14066	97%	75%	99%
30 Aug 17, 20:00	7244	6331	13575	14,300	18,600	14,200	13815	14064	14066	97%	76%	99%
30 Aug 17, 21:00	7244	6328	13572	14,000	18,800	14,400	13693	14060	14069	98%	75%	98%
30 Aug 17, 22:00	7242	6327	13569	14,100	18,800	14,300	13574	14060	14071	96%	75%	98%
30 Aug 17, 23:00	7239	6325	13564	14,100	18,800	14,400	13575	13816	14071	96%	73%	98%
30 Aug 17, 24:00	7239	6324	13563	14,000	18,700	14,600	13572	13815	14069	97%	74%	96%
31 Aug 17, 01:00	7238	6322	13560	14,000	18,900	14,600	13569	13693	14068	97%	72%	96%
31 Aug 17, 02:00	7238	6319	13557	13,900	18,800	14,600	13564	13574	14066	98%	72%	96%
31 Aug 17, 03:00	7237	6318	13555	14,000	18,800	14,600	13563	13575	14065	97%	72%	96%
31 Aug 17, 04:00	7234	6315	13549	13,900	18,800	14,600	13560	13572	14065	98%	72%	96%
31 Aug 17, 05:00	7233	6312	13545	13,900	18,600	14,700	13557	13569	14064	98%	73%	96%
31 Aug 17, 06:00	7233	6312	13545	13,700	18,600	14,600	13555	13564	14060	99%	73%	96%
31 Aug 17, 07:00	7230	6310	13540	13,700	18,600	14,700	13549	13563	14060	99%	73%	96%
31 Aug 17, 08:00	7229	6307	13536	13,700	18,600	14,700	13545	13560	13816	99%	73%	94%
31 Aug 17, 09:00	7228	6304	13532	13,700	18,700	14,900	13545	13557	13815	99%	72%	93%
31 Aug 17, 10:00	7228	6302	13530	13,800	18,500	14,900	13540	13555	13693	98%	73%	92%
31 Aug 17, 11:00	7225	6301	13525	13,700	18,400	14,900	13536	13549	13574	99%	74%	91%

31 Aug 17, 12:00	7219	6297	13515	9933	13,600	18,500	14,900	13532	13545	13575	100%	73%	91%	
31 Aug 17, 13:00	7217	6293	13509	9928	13,500	18,400	14,900	13530	13545	13572	100%	74%	91%	
31 Aug 17, 14:00	7214	6290	13504	9920	13,600	18,200	14,900	13525	13540	13569	99%	74%	91%	
31 Aug 17, 15:00	7214	6287	13502	9921	13,500	18,300	14,900	13515	9933	13536	100%	74%	91%	
31 Aug 17, 16:00	7219	6285	13504	9927	13,600	18,100	14,900	13509	9928	13532	99%	75%	91%	
31 Aug 17, 17:00	7213	6283	13497	9918	13,400	18,000	14,700	13504	9920	13530	100%	75%	92%	
31 Aug 17, 18:00	7212	6281	13493	9927	13,500	18,000	14,700	13502	9921	13525	100%	75%	92%	
31 Aug 17, 19:00	7209	6280	13489	9924	13,500	18,000	14,700	13504	9927	13515	9933	100%	75%	92%
31 Aug 17, 20:00	7208	6162	13371	9834	13,700	17,900	14,800	13497	9918	13509	9928	99%	75%	92%
31 Aug 17, 21:00	7206	6159	13366	9838	13,400	17,900	14,800	13493	9927	13504	9920	100%	75%	92%
31 Aug 17, 22:00	7205	6156	13361	9829	13,500	17,600	14,800	13489	9924	13502	9921	100%	77%	92%
31 Aug 17, 23:00	7203	6154	13357	9830	13,500	17,600	14,700	13371	9834	13504	9927	99%	77%	92%
31 Aug 17, 24:00	7200	6151	13352	9823	13,400	17,700	14,700	13366	9838	13497	9918	100%	76%	92%
01 Sep 17, 01:00	7197	6150	13347	9818	13,400	17,600	14,700	13361	9829	13493	9927	100%	77%	92%
01 Sep 17, 02:00	7195	6147	13342	9820	13,500	17,400	14,700	13357	9830	13489	9924	99%	78%	92%
01 Sep 17, 03:00	7192	6145	13338	9816	13,400	17,400	14,600	13352	9823	13371	9834	100%	77%	93%
01 Sep 17, 04:00	7191	6142	13334	9817	13,500	17,300	14,700	13347	9818	13366	9838	99%	77%	92%
01 Sep 17, 05:00	7190	6141	13331	9816	13,300	17,300	14,600	13342	9820	13361	9829	100%	77%	93%
01 Sep 17, 06:00	7187	6137	13324	9809	13,200	17,300	14,700	13338	9816	13357	9830	100%	77%	92%
01 Sep 17, 07:00	7184	6135	13319	9804	13,200	17,300	14,700	13334	9817	13352	9823	100%	77%	92%
01 Sep 17, 08:00	7182	6132	13314	9798	13,400	17,100	14,600	13331	9816	13347	9818	99%	78%	92%
01 Sep 17, 09:00	7177	6130	13307	9793	13,400	17,000		13324	9809	13342	9820	99%	78%	
01 Sep 17, 10:00	7174	6128	13302	9791	13,200	17,100		13319	9804	13338	9816	100%	78%	
01 Sep 17, 11:00	7172	6125	13297	9788	13,300	17,000		13314	9798	13334	9817	100%	78%	
01 Sep 17, 12:00	7170	6122	13292	9784	13,200	16,900		13307	9793	13331	9816	100%	79%	
01 Sep 17, 13:00	7167	6118	13285	9778	13,100	16,900		13302	9791	13324	9809	100%	79%	
01 Sep 17, 14:00	7163	6114	13277	9773	13,200	16,700		13297	9788	13319	9804	100%	80%	
01 Sep 17, 15:00	7161	6110	13271	9765	13,000	16,800		13292	9784	13314	9798	100%	79%	
01 Sep 17, 16:00	7159	6109	13268	9765	13,300	16,600		13285	9778	13307	9793	100%	80%	
01 Sep 17, 17:00	7158	6106	13264	9763	13,100	16,500		13277	9773	13302	9791	100%	81%	
01 Sep 17, 18:00	7154	6103	13257	9759	13,200	16,400		13271	9765	13297	9788	100%	81%	
01 Sep 17, 19:00	7154	6101	13255	9755	13,200	16,200		13268	9765	13292	9784	100%	82%	
01 Sep 17, 20:00	7151	6095	13246	9746	13,100	16,300		13264	9763	13285	9778	100%	82%	
01 Sep 17, 21:00	7148	6093	13241	9743	13,200	16,200		13257	9759	13277	9773	100%	82%	
01 Sep 17, 22:00	7146	6092	13238	9743	13,000	16,300		13255	9755	13271	9765	100%	81%	
01 Sep 17, 23:00	7144	6089	13233	9734	13,100	16,100		13246	9746	13268	9765	100%	82%	
01 Sep 17, 24:00	7141	6087	13228	9735	13,000	16,100		13241	9743	13264	9763	100%	82%	
02 Sep 17, 01:00	7140	6084	13223	9727	13,200	15,900		13238	9743	13257	9759	100%	83%	
02 Sep 17, 02:00	7136	6081	13217	9721	13,200	15,900		13233	9734	13255	9755	100%	83%	
02 Sep 17, 03:00	7133	6077	13210	9713	13,100	15,800		13228	9735	13246	9746	100%	84%	
02 Sep 17, 04:00	7131	6074	13204	9713	13,100	15,900		13223	9727	13241	9743	100%	83%	
02 Sep 17, 05:00	7128	6070	13198	9705	13,000	15,700		13217	9721	13238	9743	100%	84%	
02 Sep 17, 06:00	7126	6066	13193	9697	13,100	15,800		13210	9713	13233	9734	100%	84%	
02 Sep 17, 07:00	7123	6064	13187	9692	13,000	15,500		13204	9713	13228	9735	100%	85%	
02 Sep 17, 08:00	7121	6062	13183	9689	13,000	15,600		13198	9705	13223	9727	100%	85%	
02 Sep 17, 09:00	7116	6059	13176	9682	12,900	15,700		13193	9697	13217	9721	100%	84%	
02 Sep 17, 10:00	7114	6055	13169	9674	12,900	15,600		13187	9692	13210	9713	100%	85%	
02 Sep 17, 11:00	7111	6053	13164	9672	13,100	15,400		13183	9689	13204	9713	100%	86%	
02 Sep 17, 12:00	7108	6052	13160	9671	13,100	15,400		13176	9682	13198	9705	100%	86%	
02 Sep 17, 13:00	7106	6045	13151	9661	13,000	15,400		13169	9674	13193	9697	100%	86%	
02 Sep 17, 14:00	7102	6043	13145	9654	13,200	15,100		13164	9672	13187	9692	100%	87%	
02 Sep 17, 15:00	7100	6038	13137	9645	13,100	15,200		13160	9671	13183	9689	100%	87%	
02 Sep 17, 16:00	7097	6037	13134	9646	13,100	15,200	12,900	13151	9661	13176	9682	100%	87%	100%
02 Sep 17, 17:00	7095	6031	13126	9635	13,200	15,100	12,900	13145	9654	13169	9674	100%	87%	100%

02 Sep 17, 18:00	7092	6029	13120	9631	13,000	15,100	12,900	13137	9645	13164	9672	13217	9721	100%	87%	100%
02 Sep 17, 19:00	7090	6027	13116	9629	13,100	15,000	12,900	13134	9646	13160	9671	13210	9713	100%	88%	100%
02 Sep 17, 20:00	7087	6022	13110	9622	13,100	14,900	12,900	13126	9635	13151	9661	13204	9713	100%	88%	100%
02 Sep 17, 21:00	7085	6021	13107	9620	13,000	15,000	12,800	13120	9631	13145	9654	13198	9705	100%	88%	100%
02 Sep 17, 22:00	7082	6017	13099	9610	13,100	14,900	12,900	13116	9629	13137	9645	13193	9697	100%	88%	100%
02 Sep 17, 23:00	7079	6013	13092	9603	12,900	14,800	12,800	13110	9622	13134	9646	13187	9692	100%	89%	100%
02 Sep 17, 24:00	7078	6010	13088	9598	13,000	14,800	12,800	13107	9620	13126	9635	13183	9689	100%	89%	100%
03 Sep 17, 01:00	7076	6006	13082	9594	13,100	14,700	12,800	13099	9610	13120	9631	13176	9682	100%	89%	100%
03 Sep 17, 02:00	7072	6006	13078	9590	13,000	14,700	12,800	13092	9603	13116	9629	13169	9674	100%	89%	100%
03 Sep 17, 03:00	7068	6000	13068	9583	13,000	14,800	12,800	13088	9598	13110	9622	13164	9672	100%	89%	100%
03 Sep 17, 04:00	7067	5997	13063	9575	13,000	14,800	12,800	13082	9594	13107	9620	13160	9671	100%	89%	100%
03 Sep 17, 05:00	7064	5993	13057	9567	12,900	14,500	12,800	13078	9590	13099	9610	13151	9661	100%	90%	100%
03 Sep 17, 06:00	7060	5989	13050	9561	12,900	14,500	12,800	13068	9583	13092	9603	13145	9654	100%	90%	100%
03 Sep 17, 07:00	7058	5986	13044	9554	12,800	14,700	12,800	13063	9575	13088	9598	13137	9645	100%	89%	100%
03 Sep 17, 08:00	7054	5983	13037	9546	13,000	14,600	12,800	13057	9567	13082	9594	13134	9646	100%	90%	100%
03 Sep 17, 09:00	7051	5980	13032	9541	12,900	14,500	12,800	13050	9561	13078	9590	13126	9635	100%	90%	100%
03 Sep 17, 10:00	7047	5977	13024	9532	13,000	14,400	12,800	13044	9554	13068	9583	13120	9631	100%	91%	100%
03 Sep 17, 11:00	7045	5975	13020	9530	13,000	14,500	12,800	13037	9546	13063	9575	13116	9629	100%	90%	100%
03 Sep 17, 12:00	7042	5971	13012	9528	13,100	14,300	12,800	13032	9541	13057	9567	13110	9622	99%	91%	100%
03 Sep 17, 13:00	7039	5967	13006	9528	13,000	14,500	12,800	13024	9532	13050	9561	13107	9620	100%	90%	100%
03 Sep 17, 14:00	7035	5963	12998	9512	13,000	14,300	12,800	13020	9530	13044	9554	13099	9610	100%	91%	100%
03 Sep 17, 15:00	7032	5958	12990	9501	13,000	14,200	12,800	13012	9528	13037	9546	13092	9603	100%	92%	100%
03 Sep 17, 16:00	7030	5954	12984	9498	12,900	14,300	12,800	13006	9528	13032	9541	13088	9598	100%	91%	100%
03 Sep 17, 17:00	7026	5953	12980	9493	13,000	14,200	12,800	12998	9512	13024	9532	13082	9594	100%	92%	100%
03 Sep 17, 18:00	7025	5948	12973	9496	12,900	14,200	12,800	12990	9501	13020	9530	13078	9590	100%	92%	100%
03 Sep 17, 19:00	7022	5945	12967	9489	12,900	14,300	12,800	12984	9498	13012	9528	13068	9583	100%	91%	100%
03 Sep 17, 20:00	7019	5720	12740	9324	13,000	14,100	12,800	12980	9493	13006	9528	13063	9575	100%	92%	100%
03 Sep 17, 21:00	7016	5717	12733	9318	12,900	14,000	12,800	12973	9496	12998	9512	13057	9567	100%	93%	100%
03 Sep 17, 22:00	7012	5714	12726	9317	13,000	14,100	12,800	12967	9489	12990	9501	13050	9561	100%	92%	100%
03 Sep 17, 23:00	7010	5710	12721	9315	12,900	14,000	12,800	12740	9324	12984	9498	13044	9554	99%	93%	100%
03 Sep 17, 24:00	7007	5709	12717	9310	12,700	14,000	12,800	12733	9318	12980	9493	13037	9546	100%	93%	100%
04 Sep 17, 01:00	7004	5706	12710	9303	12,700	14,000	12,800	12726	9317	12973	9496	13032	9541	100%	93%	100%
04 Sep 17, 02:00	7001	5702	12703	9289	12,700	13,900	12,800	12721	9315	12967	9489	13024	9532	100%	93%	100%
04 Sep 17, 03:00	6998	5699	12697	9290	12,700	13,900	12,800	12717	9310	12740	9324	13020	9530	100%	92%	100%
04 Sep 17, 04:00	6995	5695	12690	9286	12,800	13,700	12,800	12710	9303	12733	9318	13012	9528	99%	93%	100%
04 Sep 17, 05:00	6991	5693	12685	9277	12,800	13,700	12,800	12703	9289	12726	9317	13006	9528	99%	93%	100%
04 Sep 17, 06:00	6988	5690	12678	9277	12,700	13,700	12,800	12697	9290	12721	9315	12998	9512	100%	93%	100%
04 Sep 17, 07:00	6985	5686	12671	9268	12,700	13,600	12,800	12690	9286	12717	9310	12990	9501	100%	94%	100%
04 Sep 17, 08:00	6980	5574	12555	9175	12,500	13,600	12,800	12685	9277	12710	9303	12984	9498	100%	93%	100%
04 Sep 17, 09:00	6976	5461	12437	9095	12,800	13,400	12,800	12678	9277	12703	9289	12980	9493	99%	95%	100%
04 Sep 17, 10:00	6974	5458	12432	9092	12,600	13,400	12,800	12671	9268	12697	9290	12973	9496	100%	95%	100%
04 Sep 17, 11:00	6971	5456	12428	9090	12,800	13,300	12,800	12555	9175	12690	9286	12967	9489	98%	95%	100%
04 Sep 17, 12:00	6968	5453	12420	9095	12,700	13,200	12,700	12437	9095	12685	9277	12740	9324	98%	96%	100%
04 Sep 17, 13:00	6964	5450	12414	9090	12,600	13,200	12,800	12432	9092	12678	9277	12733	9318	99%	96%	99%
04 Sep 17, 14:00	6960	5446	12406	9076	12,500	13,100	12,700	12428	9090	12671	9268	12726	9317	99%	97%	100%
04 Sep 17, 15:00	6957	5443	12400	9069	12,600	13,200	12,700	12420	9095	12555	9175	12721	9315	99%	95%	100%
04 Sep 17, 16:00	6953	5440	12393	9068	12,400	13,100	12,700	12414	9090	12437	9095	12717	9310	100%	95%	100%
04 Sep 17, 17:00	6950	5436	12386	9064	12,600	13,000	12,700	12406	9076	12432	9092	12710	9303	98%	96%	100%
04 Sep 17, 18:00	6947	5435	12382	9059	12,600	13,000	12,600	12400	9069	12428	9090	12703	9289	98%	96%	100%
04 Sep 17, 19:00	6944	5428	12372	9050	12,600	12,900	12,600	12393	9068	12420	9095	12697	9290	98%	96%	100%
04 Sep 17, 20:00	6941	5207	12148	8891	12,500	12,900	12,700	12386	9064	12414	9090	12690	9286	99%	96%	100%
04 Sep 17, 21:00	6938	5203	12141	8892	12,400	12,800	12,600	12382	9059	12406	9076	12685	9277	100%	97%	100%
04 Sep 17, 22:00	6934	5204	12138	8872	12,300	12,700	12,600	12372	9050	12400	9069	12678	9277	100%	98%	100%
04 Sep 17, 23:00	6930	5198	12129	8882	12,400	12,700	12,600	12148	8891	12393	9068	12671	9268	98%	98%	100%

04 Sep 17, 24:00	6928	5196	12124	8869	12,300	12,600	12,600	12141	8892	12386	9064	12555	9175	99%	98%	100%
05 Sep 17, 01:00	6925	5195	12120	8864	12,400	12,500	12,600	12138	8872	12382	9059	12437	9095	98%	99%	99%
05 Sep 17, 02:00	6920	5191	12111	8862	12,400	12,500	12,500	12129	8882	12372	9050	12432	9092	98%	99%	99%
05 Sep 17, 03:00	6918	5188	12106	8858	12,300	12,400	12,500	12124	8869	12148	8891	12428	9090	99%	98%	99%
05 Sep 17, 04:00	6913	5185	12098	8848	12,400	12,400	12,500	12120	8864	12141	8892	12420	9095	98%	98%	99%
05 Sep 17, 05:00	6910	5181	12092	8861	12,300	12,400	12,500	12111	8862	12138	8872	12414	9090	98%	98%	99%
05 Sep 17, 06:00	6907	5179	12086	8838	12,200	12,100	12,400	12106	8858	12129	8882	12406	9076	99%	100%	100%
05 Sep 17, 07:00	6904	5178	12082	8844	12,300	12,000	12,400	12098	8848	12124	8869	12400	9069	98%	100%	100%
05 Sep 17, 08:00	6900	4955	11856	8669	12,200	12,000	12,400	12092	8861	12120	8864	12393	9068	99%	100%	100%
05 Sep 17, 09:00	6897	4954	11851	8661	12,300	12,000	12,300	12086	8838	12111	8862	12386	9064	98%	100%	100%
05 Sep 17, 10:00	6893	4952	11845	8665	12,200	12,000	12,300	12082	8844	12106	8858	12382	9059	99%	100%	100%
05 Sep 17, 11:00	6889	4949	11838	8661	12,100	11,900	12,300	11856	8669	12098	8848	12372	9050	98%	100%	100%
05 Sep 17, 12:00	6886	4945	11831	8656	12,000	11,900	12,300	11851	8661	12092	8861	12148	8891	99%	100%	99%
05 Sep 17, 13:00	6882	4944	11826	8645	12,100	11,800	12,200	11845	8665	12086	8838	12141	8892	98%	100%	100%
05 Sep 17, 14:00	6878	4940	11818	8663	12,100	11,800	12,200	11838	8661	12082	8844	12138	8872	98%	100%	99%
05 Sep 17, 15:00	6874	4937	11811	8644	12,000	11,700	12,200	11831	8656	11856	8669	12129	8882	99%	100%	99%
05 Sep 17, 16:00	6871	4935	11807	8640	11,900	11,800	12,100	11826	8645	11851	8661	12124	8869	99%	100%	100%
05 Sep 17, 17:00	6867	4932	11799	8629	12,100	11,800	12,100	11818	8663	11845	8665	12120	8864	98%	100%	100%
05 Sep 17, 18:00	6866	4927	11793	8625	12,000	11,700	12,000	11811	8644	11838	8661	12111	8862	98%	100%	100%
05 Sep 17, 19:00	6863	4926	11789	8622	12,000	11,700	12,000	11807	8640	11831	8656	12106	8858	98%	100%	100%
05 Sep 17, 20:00	6858	4703	11561	8452	11,900	11,700	12,000	11799	8629	11826	8645	12098	8848	99%	100%	100%
05 Sep 17, 21:00	6854	4702	11557	8455	12,000	11,600	11,900	11793	8625	11818	8663	12092	8861	98%	100%	100%
05 Sep 17, 22:00	6852	4701	11552	8453	11,800	11,700	11,900	11789	8622	11811	8644	12086	8838	100%	100%	100%
05 Sep 17, 23:00	6848	4698	11546	8443	11,900	11,600	11,900	11561	8452	11807	8640	12082	8844	97%	100%	100%
05 Sep 17, 24:00	6844	4695	11539	8453	11,800	11,600	11,800	11557	8455	11799	8629	11856	8669	98%	100%	100%
06 Sep 17, 01:00	6840	4693	11533	8433	11,800	11,600	11,800	11552	8453	11793	8625	11851	8661	98%	100%	100%
06 Sep 17, 02:00	6837	4689	11526	8433	11,700	11,500	11,800	11546	8443	11789	8622	11845	8665	99%	100%	100%
06 Sep 17, 03:00	6831	4689	11521	8425	11,800	11,600	11,700	11539	8453	11561	8452	11838	8661	98%	100%	100%
06 Sep 17, 04:00	6829	4686	11515	8430	11,700	11,600	11,800	11533	8433	11557	8455	11831	8656	99%	100%	100%
06 Sep 17, 05:00	6823	4678	11501	8415	11,700	11,600	11,800	11526	8433	11552	8453	11826	8645	99%	100%	100%
06 Sep 17, 06:00	6819	4677	11497	8403	11,700	11,600	11,700	11521	8425	11546	8443	11818	8663	98%	100%	100%
06 Sep 17, 07:00	6818	4457	11275	8226	11,800	11,500	11,700	11515	8430	11539	8453	11811	8644	98%	100%	100%
06 Sep 17, 08:00	6815	4454	11269	8230	11,600	11,500	11,600	11501	8415	11533	8433	11807	8640	99%	100%	100%
06 Sep 17, 09:00	6816	4453	11269	8226	11,600	11,400	11,600	11497	8403	11526	8433	11799	8629	99%	100%	100%
06 Sep 17, 10:00	6807	4449	11256	8227	11,700	11,500	11,600	11275	8226	11521	8425	11793	8625	96%	100%	100%
06 Sep 17, 11:00	6799	4447	11246	8212	11,700	11,500	11,500	11269	8230	11515	8430	11789	8622	96%	100%	100%
06 Sep 17, 12:00	6799	4445	11244	8219	11,600	11,500	11,500	11269	8226	11501	8415	11561	8452	97%	100%	100%
06 Sep 17, 13:00	6794	4443	11237	8206	11,500	11,400	11,500	11256	8227	11497	8403	11557	8455	98%	100%	100%
06 Sep 17, 14:00	6790	4439	11229	8207	11,500	11,400	11,400	11246	8212	11275	8226	11552	8453	98%	99%	100%
06 Sep 17, 15:00	6787	4440	11227	8206	11,500	11,500	11,400	11244	8219	11269	8230	11546	8443	98%	98%	100%
06 Sep 17, 16:00	6784	4436	11220	8192	11,500	11,400	11,400	11237	8206	11269	8226	11539	8453	98%	99%	100%
06 Sep 17, 17:00	6778	4433	11211	8185	11,400	11,400	11,400	11229	8207	11256	8227	11533	8433	98%	99%	100%
06 Sep 17, 18:00	6770	4432	11202	8175	11,400	11,500	11,400	11227	8206	11246	8212	11526	8433	98%	98%	100%
06 Sep 17, 19:00	6771	4430	11201	8177	11,400	11,400	11,300	11220	8192	11244	8219	11521	8425	98%	99%	100%
06 Sep 17, 20:00	6765	4212	10978	8006	11,300	11,300	11,300	11211	8185	11237	8206	11515	8430	99%	99%	100%
06 Sep 17, 21:00	6769	4213	10982	8021	11,300	11,300	11,300	11202	8175	11229	8207	11501	8415	99%	99%	100%
06 Sep 17, 22:00	6764	4211	10974	8021	11,300	11,200	11,300	11201	8177	11227	8206	11497	8403	99%	100%	100%
06 Sep 17, 23:00	6765	4210	10975	8008	11,300	11,300	11,200	10978	8006	11220	8192	11275	8226	97%	99%	100%
06 Sep 17, 24:00	6762	4208	10969	8009	11,300	11,300	11,200	10982	8021	11211	8185	11269	8230	97%	99%	100%
07 Sep 17, 01:00	6751	4204	10956	8001	11,200	11,300	11,200	10974	8021	11202	8175	11269	8226	98%	99%	100%
07 Sep 17, 02:00	6750	4203	10952	7998	11,200	11,200	11,000	10975	8008	11201	8177	11256	8227	98%	100%	100%
07 Sep 17, 03:00	6742	4200	10943	7989	11,200	11,300	11,100	10969	8009	10978	8006	11246	8212	98%	97%	100%
07 Sep 17, 04:00	6737	4199	10935	7981	11,200	11,200	11,200	10956	8001	10982	8021	11244	8219	98%	98%	100%
07 Sep 17, 05:00	6738	4196	10935	7974	11,100	11,200	11,100	10952	7998	10974	8021	11237	8206	99%	98%	100%

07 Sep 17, 06:00	6737	4192	10930	7983	11,100	11,100	11,000	10943	7989	10975	8008	11229	8207	99%	99%	100%
07 Sep 17, 07:00	6730	4190	10920	7974	11,000	11,200	11,100	10935	7981	10969	8009	11227	8206	99%	98%	100%
07 Sep 17, 08:00	6720	3969	10689	7793	11,100	11,100	10,900	10935	7974	10956	8001	11220	8192	99%	99%	100%
07 Sep 17, 09:00	6720	3966	10686	7798	11,000	11,100	11,100	10930	7983	10952	7998	11211	8185	99%	99%	100%
07 Sep 17, 10:00	6725	3964	10689	7799	11,000	11,100	11,000	10920	7974	10943	7989	11202	8175	99%	99%	100%
07 Sep 17, 11:00	6709	3962	10672	7777	10,800	11,000	10,900	10689	7793	10935	7981	11201	8177	99%	99%	100%
07 Sep 17, 12:00	6706	3962	10669	7778	10,800	11,000	11,000	10686	7798	10935	7974	10978	8006	99%	99%	100%
07 Sep 17, 13:00	6702	3959	10661	7769	10,800	10,800	11,000	10689	7799	10930	7983	10982	8021	99%	100%	100%
07 Sep 17, 14:00	6472	3957	10429	7909	10,800	11,000	10,700	10672	7777	10920	7974	10974	8021	99%	99%	100%
07 Sep 17, 15:00	6467	3956	10423	7905	10,700	10,900	10,900	10669	7778	10689	7793	10975	8008	100%	98%	100%
07 Sep 17, 16:00	6462	3954	10416	7916	10,700	10,900	10,700	10661	7769	10686	7798	10969	8009	100%	98%	100%
07 Sep 17, 17:00	6458	3952	10409	7901	10,600	10,700	10,800	10429	7909	10689	7799	10956	8001	98%	100%	100%
07 Sep 17, 18:00	6457	3950	10407	7901	10,600	10,800	10,700	10423	7905	10672	7777	10952	7998	98%	99%	100%
07 Sep 17, 19:00	6448	3949	10397	7895	10,600	10,800	10,900	10416	7916	10669	7778	10943	7989	98%	99%	100%
07 Sep 17, 20:00	6222	3731	9953	7867	10,500	10,700	10,700	10409	7901	10661	7769	10935	7981	99%	100%	100%
07 Sep 17, 21:00	6237	3730	9966	7908	10,500	10,700	10,600	10407	7901	10429	7909	10935	7974	99%	97%	100%
07 Sep 17, 22:00	6235	3728	9963	7895	10,300	10,700	10,800	10397	7895	10423	7905	10930	7983	100%	97%	100%
07 Sep 17, 23:00	6224	3727	9951	7883	10,300	10,700	10,700	9953	7867	10416	7916	10920	7974	97%	97%	100%
07 Sep 17, 24:00	6215	3725	9939	7871	10,200	10,500	10,700	9966	7908	10409	7901	10689	7793	98%	99%	100%
08 Sep 17, 01:00	6209	3721	9930	7861	10,200	10,500	10,700	9963	7895	10407	7901	10686	7798	98%	99%	100%
08 Sep 17, 02:00	6206	3720	9925	7860	10,100	10,400	10,400	9951	7883	10397	7895	10689	7799	99%	100%	100%
08 Sep 17, 03:00	6204	3718	9922	7860	10,000	10,400	10,400	9939	7871	9953	7867	10672	7777	99%	96%	100%
08 Sep 17, 04:00	6202	3717	9920	7861	10,000	10,400	10,400	9930	7861	9966	7908	10669	7778	99%	96%	100%
08 Sep 17, 05:00	6199	3715	9914	7854	9,920	10,300	10,300	9925	7860	9963	7895	10661	7769	100%	97%	100%
08 Sep 17, 06:00	6200	3714	9914	7858	9,870	10,300	10,100	9922	7860	9951	7883	10429	7909	100%	97%	100%
08 Sep 17, 07:00	6195	3712	9907	7848	9,910	10,300	10,100	9920	7861	9939	7871	10423	7905	100%	96%	100%
08 Sep 17, 08:00	5962	3490	9452	7198	9,850	10,200	10,000	9914	7854	9930	7861	10416	7916	100%	97%	100%
08 Sep 17, 09:00	5957	3490	9446	7197	9,770	10,200	10,000	9914	7858	9925	7860	10409	7901	100%	97%	100%
08 Sep 17, 10:00	5952	3486	9439	7187	9,640	10,100	9,960	9907	7848	9922	7860	10407	7901	100%	98%	100%
08 Sep 17, 11:00	5950	3485	9435	7179	9,610	10,000	9,970	9452	7198	9920	7861	10397	7895	98%	99%	100%
08 Sep 17, 12:00	5949	3482	9431	7207	9,510	10,100		9446	7197	9914	7854	9953	7867	99%	98%	
08 Sep 17, 13:00	5945	3480	9425	7199	9,490	10,100	10,000	9439	7187	9914	7858	9966	7908	99%	98%	100%
08 Sep 17, 14:00	5719	3480	9199	6699	9,420	10,100	9,950	9435	7179	9907	7848	9963	7895	100%	98%	100%
08 Sep 17, 15:00	5721	3480	9200	6691	9,280	10,000	9,900	9431	7207	9452	7198	9951	7883	100%	95%	100%
08 Sep 17, 16:00	5719	3478	9197	6705	9,110	9,930	9,830	9425	7199	9446	7197	9939	7871	100%	95%	100%
08 Sep 17, 17:00	5711	3477	9188	6696	9,020	9,930	9,840	9199	6699	9439	7187	9930	7861	100%	95%	100%
08 Sep 17, 18:00	5708	3474	9182	6690	8,820	9,820	9,820	9200	6691	9435	7179	9925	7860	100%	96%	100%
08 Sep 17, 19:00	5704	3474	9178	6698	8,680	9,880	9,780	9197	6705	9431	7207	9922	7860	100%	95%	100%
08 Sep 17, 20:00	5478	3252	8730	6542	8,660	9,800	9,720	9188	6696	9425	7199	9920	7861	100%	96%	100%
08 Sep 17, 21:00	5476	3253	8728	6368	8,520	9,720	9,710	9182	6690	9199	6699	9914	7854	100%	95%	100%
08 Sep 17, 22:00	5473	3252	8725	6371	8,410	9,700	9,670	9178	6698	9200	6691	9914	7858	100%	95%	100%
08 Sep 17, 23:00	5469	3252	8721	6376	8,300	9,610	9,660	8730	6542	9197	6705	9907	7848	100%	96%	100%
08 Sep 17, 24:00	5466	3250	8716	6380	8,200	9,580	9,610	8728	6368	9188	6696	9452	7198	100%	96%	98%
09 Sep 17, 01:00	5464	3249	8713	6382	8,090	9,480	9,560	8725	6371	9182	6690	9446	7197	100%	97%	99%
09 Sep 17, 02:00	5458	3247	8705	6381	8,000	9,450	9,520	8721	6376	9178	6698	9439	7187	100%	97%	99%
09 Sep 17, 03:00	5456	3246	8702	6383	7,820	9,330	9,480	8716	6380	8730	6542	9435	7179	100%	94%	100%
09 Sep 17, 04:00	5453	3245	8698	6389	7,850	9,280	9,420	8713	6382	8728	6368	9431	7207	100%	94%	100%
09 Sep 17, 05:00	5449	3244	8693	6393	7,720	9,190	9,340	8705	6381	8725	6371	9425	7199	100%	95%	100%
09 Sep 17, 06:00	5448	3243	8690	6390	7,610	9,090	9,250	8702	6383	8721	6376	9199	6699	100%	96%	99%
09 Sep 17, 07:00	5445	3241	8687	6393	7,640	9,040	9,220	8698	6389	8716	6380	9200	6691	100%	96%	100%
09 Sep 17, 08:00	5218	3024	8242	6354	7,490	8,980	9,170	8693	6393	8713	6382	9197	6705	100%	97%	100%
09 Sep 17, 09:00	5212	3023	8235	6367	7,460	8,970	9,110	8690	6390	8705	6381	9188	6696	100%	97%	100%
09 Sep 17, 10:00	5209	3020	8229	6365	7,380	8,960	9,050	8687	6393	8702	6383	9182	6690	100%	97%	100%
09 Sep 17, 11:00	5207	3017	8224	6369	7,300	8,850	9,030	8242	6354	8698	6389	9178	6698	100%	98%	100%

09 Sep 17, 12:00	5206	3017	8223	6383	7,240	8,810	8,990	8235	6367	8693	6393	8730	6542
09 Sep 17, 13:00	5202	3015	8217	6382	7,240	8,790	8,960	8229	6365	8690	6390	8728	6368
09 Sep 17, 14:00	5198	3014	8212	6400	7,190	8,750	8,900	8224	6369	8687	6393	8725	6371
09 Sep 17, 15:00	5196	3013	8209	6402	7,170	8,660	8,830	8223	6383	8242	6354	8721	6376
09 Sep 17, 16:00	5193	3012	8205	6407	7,160	8,620	8,840	8217	6382	8235	6367	8716	6380
09 Sep 17, 17:00	5194	3011	8205	6429	7,150	8,570	8,740	8212	6400	8229	6365	8713	6382
09 Sep 17, 18:00	5181	3010	8191	6409	7,110	8,420	8,720	8209	6402	8224	6369	8705	6381
09 Sep 17, 19:00	5180	3008	8188	6418	7,160	8,380	8,660	8205	6407	8223	6383	8702	6383
09 Sep 17, 20:00	4956	3007	7964	6567	7,110	8,370	8,640	8205	6429	8217	6382	8698	6389
09 Sep 17, 21:00	4953	3007	7960	6569	7,070	8,310	8,590	8191	6409	8212	6400	8693	6393
09 Sep 17, 22:00	4947	3007	7955	6580	7,040	8,260	8,550	8188	6418	8209	6402	8690	6390
09 Sep 17, 23:00	4945	3005	7950	6584	7,010		8,510	7964	6567	8205	6407	8687	6393
09 Sep 17, 24:00	4945	3005	7950	6591			8,440	7960	6569	8205	6429	8242	6354
10 Sep 17, 01:00	4946	3004	7950	6610				7955	6580	8191	6409	8235	6367
10 Sep 17, 02:00	4945	3003	7947	6610				7950	6584	8188	6418	8229	6365
10 Sep 17, 03:00	4940	3002	7942	6618				7950	6591	7964	6567	8224	6369
10 Sep 17, 04:00	4937	3001	7938	6628				7950	6610	7960	6569	8223	6383
10 Sep 17, 05:00	4928	2999	7927	6613				7947	6610	7955	6580	8217	6382
10 Sep 17, 06:00	4928	2999	7927	6630				7942	6618	7950	6584	8212	6400
10 Sep 17, 07:00	4926	2998	7924	6639				7938	6628	7950	6591	8209	6402
10 Sep 17, 08:00	4699	2996	7695					7927	6613	7950	6610	8205	6407
10 Sep 17, 09:00	4697	2994	7691					7927	6630	7947	6610	8205	6429
10 Sep 17, 10:00	4697	2993	7690					0	6639	7942	6618	8191	6409
10 Sep 17, 11:00	4691	2992	7683					0		7938	6628	8188	6418
10 Sep 17, 12:00	4688	2990	7678					0		7927	6613	7964	6567
10 Sep 17, 13:00	4686	2988	7674					0		7927	6630	7960	6569
10 Sep 17, 14:00	3789	2987	6776					0		0	6639	7955	6580
10 Sep 17, 15:00	3788	2986	6774					0		0		7950	6584
10 Sep 17, 16:00	3787	2984	6771					0		0		7950	6591
10 Sep 17, 17:00	3788	2983	6771					0		0		7950	6610
10 Sep 17, 18:00	3782	2982	6764					0		0		7947	6610
10 Sep 17, 19:00	3779	2981	6760					0		0		7942	6618
10 Sep 17, 20:00	3777	2982	6759					0		0		7938	6628
10 Sep 17, 21:00	3777	2980	6757					0		0		7927	6613
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11 Sep 17, 02:00	3769	2975	6744					0		0		0	
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11 Sep 17, 04:00	3765	2973	6738					0		0		0	
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11 Sep 17, 17:00	3750	2955	6705					0		0		0	

100%	99%	97%
100%	99%	97%
100%	99%	98%
100%	95%	99%
100%	96%	99%
100%	96%	100%
100%	98%	100%
100%	98%	100%
100%	98%	100%
100%	99%	100%
100%	99%	100%
100%		100%
		98%

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16 Sep 17, 04:00	1744	1475	3219	0	0	0
16 Sep 17, 05:00	1744	1475	3219	0	0	0

Addicks and Barker Flood Control Reservoirs - Downstream Hydraulic Study

Expert Report of Dr. R. Nairn (Downstream)

November 13 2018 | 12879.101.R2.Rev0

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Prepared by:

Baird.
Innovation Engineered.

W.F. Baird & Associates Ltd.

For further information, please contact

Rob Nairn at +1 608 273 0592

rnairn@baird.com

www.baird.com

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Summary of Opinions

General Opinions on Dam Operations

Hurricane Harvey exceeded Addicks and Barker Reservoirs hydraulic design conditions

The Addicks and Barker dams are designed for short term impoundment of storm water runoff. The United States Army Corps of Engineers (the Corps) designed the reservoirs based on inflow hydrographs exceeding the estimated runoff during the 1935 flood, which was the storm of record at that time.

After construction of the dams, the concept of Standard Project Floods (SPFs) entered the lexicon. The SPF is the flood that represents the most severe hydrologic conditions considered reasonably characteristic of the geographic region. The SPF has been revised for the dams over time. It was defined in the 1962 Reservoir Regulation Manual and most recently updated in the 1977 Hydrology Report. During the 2017 Hurricane Harvey event, the combined cumulative inflows to Addicks and Barker Reservoirs reached at least 450,000 acre-feet. This exceeded the 1962 SPF cumulative inflows by 63% (in addition to exceeding the 1962 SPF peak inflows by 2 to 4 times) and exceeded the 1977 revised SPF cumulative inflow to Addicks and Barker Reservoirs by 41%. The Harvey Event also exceeded the 2012 Water Control Manual SPF water surface elevations and resulted in uncontrolled spill around the north end of Addicks Reservoir for the first time in the history of the project. Due to the intensity and duration of rainfall associated with the Harvey Event, the Corps made releases in accordance with the induced surcharge release schedule for the first time in the history of the two reservoirs.

The Harvey Event exceeded the original and the revised SPF cumulative inflows to Addicks and Barker Reservoirs.

Addicks and Barker Reservoir capacities are smaller than the volume of the floodwater generated during the Harvey Event, but they effectively reduced peak flows downstream of the dams, as they were designed to do.

The combined capacity of Addicks and Barker Reservoirs is 210,500 acre-feet (68.6 billion gallons) of water within the Government Owned Land (GOL). This combined capacity is approximately 20% greater than the amount of floodwater generated under the pre-Harvey 100-year flood frequency. During the Harvey Event, at least 450,000 acre-feet of floodwater flowed into Addicks and Barker Reservoirs, significantly exceeding their combined capacity and dictating significant releases from the reservoirs.

The maximum combined discharge capacity of Addicks and Barker release conduits is approximately 16,000 cfs. During the Harvey Event, floodwater inflow rates to Addicks and Barker Reservoirs reached at least 160,000 cfs. Therefore, the maximum combined capacity of the release conduits was significantly exceeded. The difference in magnitude between the rapid inflow rates and the restricted outflow rates resulted in an initially rapid increase of water surface elevations behind the dams.

Despite the releases that were made during the Harvey Event, the reservoirs effectively reduced peak flows downstream of the dams, as they were designed to do.

Flooding was unavoidable during the Harvey Event

Flooding during the Harvey Event was unavoidable due to the following reasons:

- The total cumulative inflow to Addicks and Barker Reservoirs during the Harvey Event was more than twice the combined capacity of the reservoirs within the GOL.
- The maximum combined capacity of the release conduits could not discharge the excess volume of water during the Harvey Event. As such, upstream flooding was unavoidable.
- The Harvey Event exceeded the hydraulic design conditions of the Addicks and Barker Reservoirs, which required releases in accordance with the induced surcharge schedule. As such, downstream flooding was unavoidable.

Our modeling efforts showed that opening the gates entirely or, alternatively, never constructing the dams, would have resulted in much higher flooding to downstream properties, including the downstream Test Properties, than actually occurred. On the other hand, our modeling efforts showed that closing the gates entirely would have resulted in greater flood depths and much longer flood durations at upstream properties, including the upstream Test Properties, than actually occurred. We utilized a similar modeling approach in the upstream sub-case using the same model inputs used for the downstream sub-case. We summarize those results for the upstream Test Properties in Appendix C. The upstream modeling results demonstrate clearly that flooding during the Harvey Event was unavoidable.

Opinions on Downstream Flooding during the Harvey Event

The Addicks and Barker Dams have prevented devastating flooding of the downstream Test Properties and other downstream properties

Addicks and Barker Reservoirs stored at least 127 billion gallons of floodwater during the Harvey Event, without accounting for floodwater stored in detention ponds and tributaries above the reservoirs. This volume of floodwater was gradually released over a period of one month. Without these reservoirs, this floodwater would have been routed to areas downstream much more rapidly, causing more devastating flooding to all of the downstream Test Properties and other downstream areas, as compared to the flooding that actually occurred.

The federal project allows for the distribution of flood impacts across a wide area to minimize the chance of life-threatening conditions in any one area. Downstream of the dams, the federal project (and particularly the operation of the Addicks and Barker Dams) allowed for floodwater accumulated during the Harvey Event (a few days) to be distributed over a much longer period (a few weeks), which effectively reduced the depth of floodwaters downstream of the dams.

Our analysis showed that the downstream Test Properties would have experienced flood depths up to 8.6 feet greater without the federal project than they actually experienced. Under this scenario, this additional inundation without the federal project would have resulted in water depths of more than 10 to 15 feet above first finished floor elevations of the downstream Test Properties. The federal project prevented significant property damages and significantly reduced the risk of loss of life for downstream areas.

Effectiveness of lower Buffalo Bayou Rectification

Our analysis showed that the rectification of lower Buffalo Bayou downstream of the dams (i.e., Lower Langham Creek and the portion of Buffalo Bayou downstream of the dams, but upstream of Beltway 8) reduced flood durations on the downstream Test Properties by up to 2 days. Eight of the thirteen Test Properties are located along this rectified portion of Buffalo Bayou belonging to the following plaintiffs: Good Resources LLC, Memorial SMC Investment 2013 LP, Arnold and Virginia Milton, Jennifer Shipos, Wayne and Peggy Hollis, Peter and Zhennia Silverman, Arnstein and Inga Godejords, and Paul and Dana Cutts.

Effectiveness of gate control

Our analysis demonstrated that first finished floors at downstream Test Properties would have been flooded by up to 3.7 feet more water if the Corps had kept the reservoir gates open during the Harvey Event, as compared to the flooding that actually occurred. In addition, our analysis showed that the downstream Test Properties would have experienced longer flooding than actually occurred if the Corps had kept the reservoir gates open during the Harvey Event.

The gated conduits at Addicks and Barker Dams effectively reduced flooding impacts downstream of the dams during the Harvey Event.

Repeated flooding below the dams caused by historical storms under the no-federal-project scenario

Our analysis showed that the downstream Test Properties would have repeatedly flooded during historical storms (dated 1975, 1994, 2001, 2009, 2015 and 2016) in the absence of the federal project. The existence and operation of the federal project prevented, or significantly reduced, flooding on the Test Properties during these events.

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Appendix A Addicks and Barker Discharge Equations

Appendix B Dr. Rob Nairn CV Expert Witness Experience and Compensation

Appendix C Results of Upstream Hydraulic Study

Addicks and Barker Flood Control Reservoirs - Downstream Hydraulic Study
Expert Report of Dr. R. Nairn (Downstream)

Baird.

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1. Introduction

Plaintiffs, who are property owners in the western Houston area, filed claims against the United States of America (Defendant), alleging takings of their properties associated with flooding during the extreme weather event commonly referred to as Hurricane Harvey (August 25th to August 31st, 2017, hereinafter referred to as the “Harvey Event”). Plaintiffs’ claims are hereinafter referred to as “the Case”.

Dr. Rob Nairn of Baird & Associates was retained by the US Department of Justice (DOJ) to provide expert testimony in relation to the Case. This report presents analysis and findings related to the Case. Dr. Nairn’s CV, his previous testimony and his remuneration are presented in Appendix B.

1.1 Definitions

- “The Case” refers to *In re Upstream Addicks and Barker, (Texas) Flood Control Reservoirs*, 1:17-cv-09001, and *In re Downstream Addicks and Barker (Texas) Flood Control Reservoirs*, 1:17-cv-09002.
- “Corps” refers to the United States Army Corps of Engineers.
- The “Harvey Event” refers to Hurricane Harvey landfall event from August 25th to August 31st, 2017.
- “Focus Area” refers to the area considered by this study for detailed analysis, as defined in Section 2.1, including all Test Plaintiffs.
- “Focus Period” refers to the period of reported inundation within the Focus Area between August 26 and September 12, 2017, as defined in Section 2.1.
- “Plaintiffs” or “Plaintiff” refers to any of the individuals or entities who filed claims related to the Case within the Focus Area.
- “Defendant” means the United States of America.
- “Upstream Areas” means the areas upstream of the Addicks and Barker Reservoirs within the Focus Area.
- “Downstream Areas” means the areas downstream of the Addicks and Barker Dams within the Focus Area.
- “Test Plaintiffs” or “Test Properties” refer to Plaintiffs and their properties, selected by the parties for expert consideration.
- “GOL” refers to Government Owned Land.
- “USGS” refers to the United States Geological Survey.
- “HCFCD” refers to the Harris County Flood Control District.
- “Lower Langham Creek” refers to the outlet channel of Addicks Reservoir extending from the Addicks outlet to the confluence with lower Buffalo Bayou (approximately 1.3 miles in length).
- “GIS” refers to Geographic Information System, which is “a framework for gathering, managing, and analyzing data. Rooted in the science of geography, GIS integrates many types of data. It analyzes spatial location and organizes layers of information into visualizations using maps” (<https://www.esri.com/en-us/what-is-gis/overview>).
- “NAVD88”, “NAVD88 (2001 adjustment)” or “NAVD 1988” refers to the North American Vertical Datum of 1988, which is the current vertical datum for the contiguous United States and Alaska. NAVD88 is “a fixed reference for elevations determined by geodetic leveling. The datum was derived from a general adjustment of the first-order terrestrial leveling nets of the United States, Canada, and Mexico.” (https://tidesandcurrents.noaa.gov/datum_options.html).
- “Waterbody” refers to a general word that encompasses all types of free surface water bodies such as channels, bayous, lakes, reservoirs, oceans, etc.

- “Tailwater” refers to water downstream of any given waterbody.
- “Steady Flow” refers to a flow regime where discharge and flow depth do not change with time.
- “Flow Regime” refers to the type of flow through channels and streams, which could be “Uniform Flow”, “Non-uniform Flow”, “Steady Flow”, and/or “Backwater Flow”.
- “Uniform Flow” refers to a flow regime where the slopes of the channel bed, water surface and energy grade line are equal.
- “Non-uniform flow” refers to a flow regime which is not uniform.
- “Backwater flow” refers to a non-uniform flow regime where water surface slope becomes flatter than the slope of the channel bed due to channel constrictions, dams, and/or high tailwater surface elevation.
- “WSE” refers to Water Surface Elevation.
- “Runoff” or “surface runoff” refers to gravity-driven flow of water over the ground surface due to excess rainfall, stormwater or any other source.
- “Excessive runoff” refers to runoff discharges beyond the capacity of the receiving stormwater drainage system.
- “SPF” refers to Standard Project Flood, which is defined “as a hydrograph representing runoff from the Standard Project Storm” (SPS). The SPS “should represents the most severe flood-producing rainfall depth-area-duration relationship and isohyetal pattern of any storm that is considered reasonably characteristic of the region in which the drainage basin is located” [1, p. USACE000497]. The SPF defines the hydraulic design criteria of a reservoir.
- “SDF” refers to Spillway Design Flood, which is the maximum flood that could cause flow over a spillway without causing serious structural damage.

1.2 Study Objectives

This study focuses on the hydraulic aspects of the Addicks and Barker Dams without consideration of structural or geotechnical aspects (i.e., structural dam safety aspects). The following are the main objectives of this hydraulic study:

- Define hydraulic factors that resulted in inundation during the Harvey Event within the Focus Area. To address this objective, the following analyses have been completed:
 - Analysis of physical data during the Harvey Event; and
 - Numerical modeling of inundation during the Harvey Event to fill the physical data gaps (between and beyond the gages where water levels were measured) and to simulate hypothetical scenarios to define and/or isolate hydraulic factors contributing to inundation within the Focus Area.
- Provide a tool to evaluate flooding under various hypothetical scenarios. To address this objective, numerical model simulations have been completed for:
 - A hypothetical scenario where the Addicks and Barker Dams were removed;
 - A hypothetical gate operation scenario where the gates are simulated as fully open for the duration of the Harvey Event; and
 - A set of hypothetical scenarios simulating flooding due to other historical storms without federal improvements on GOL (i.e. without the dams and channel improvements).

2. Site Conditions

This section provides a description of the site conditions upstream and downstream of the Addicks and Barker Dams.

2.1 Focus Area and Focus Period

Hurricane Harvey made landfall in the Southeast Texas area dropping 30 to 40 inches of rainfall on Harris County¹ between August 25 and August 31, 2017, which caused overbank flooding and inundation of land. Damages, allegedly due to inundation of homes, have been reported during the period from August 26, 2017 [2] to September 12, 2017 [3], [4] (hereinafter referred to as the "Focus Period").

This study focuses on inundation of the following areas, hereinafter referred to as the "Focus Area":

- Areas upstream of Addicks and Barker Reservoirs within a 2-mile buffer from the GOL and bounded by Westpark Tollway (South) and W Little York Rd (North).
- Areas along Buffalo Bayou downstream of Addicks and Barker Dams down to Shepherd Drive bounded by Westheimer Rd (South) and Interstate 10 (North).

The Focus Area is shown in Figure 2.1 along with locations of downstream Test Plaintiffs.

¹ Approximate range based on Harris County Flood Control District's gage data [14]. The National Weather Service (NWS) "estimated anywhere from 20 to 30 TRILLION TONS of water was dumped onto Texas" [57].

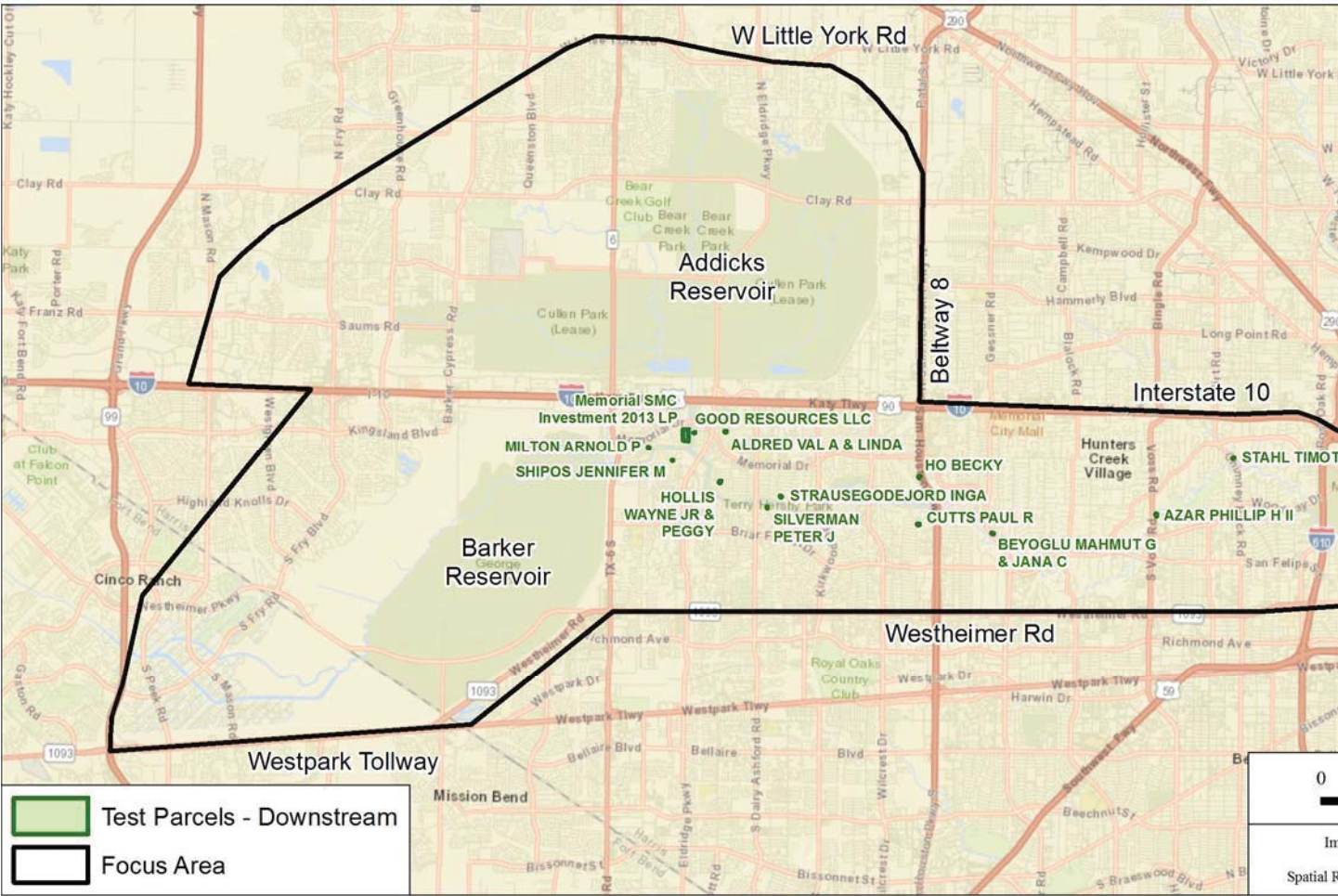


Figure 2.1: Focus Area, green polygons represent locations of downstream Test Plaintiffs.

Addicks and Barker Flood Control Reservoirs - Downstream Hydraulic Study
Expert Report of Dr. R. Naim (Downstream)

2.2 Watershed

Harris County has classified 22 major watersheds draining into 22 major waterways [5]. Figure 2.2 shows watershed boundaries, which are largely determined by the topography. Each of these watersheds ultimately drains into Galveston Bay [6, p. FEMA000165].

Many of the drainage basins within Harris County² are characterized by basin overflow [6, p. FEMA000249], which occurs when the water surface elevations exceed the elevations of the drainage basin divide. “Under major flood events, Addicks Reservoir receives about one-third of its total volume from the 130 square mile drainage area of the Upper Cypress Creek Basin” [7, p. USACE020199].

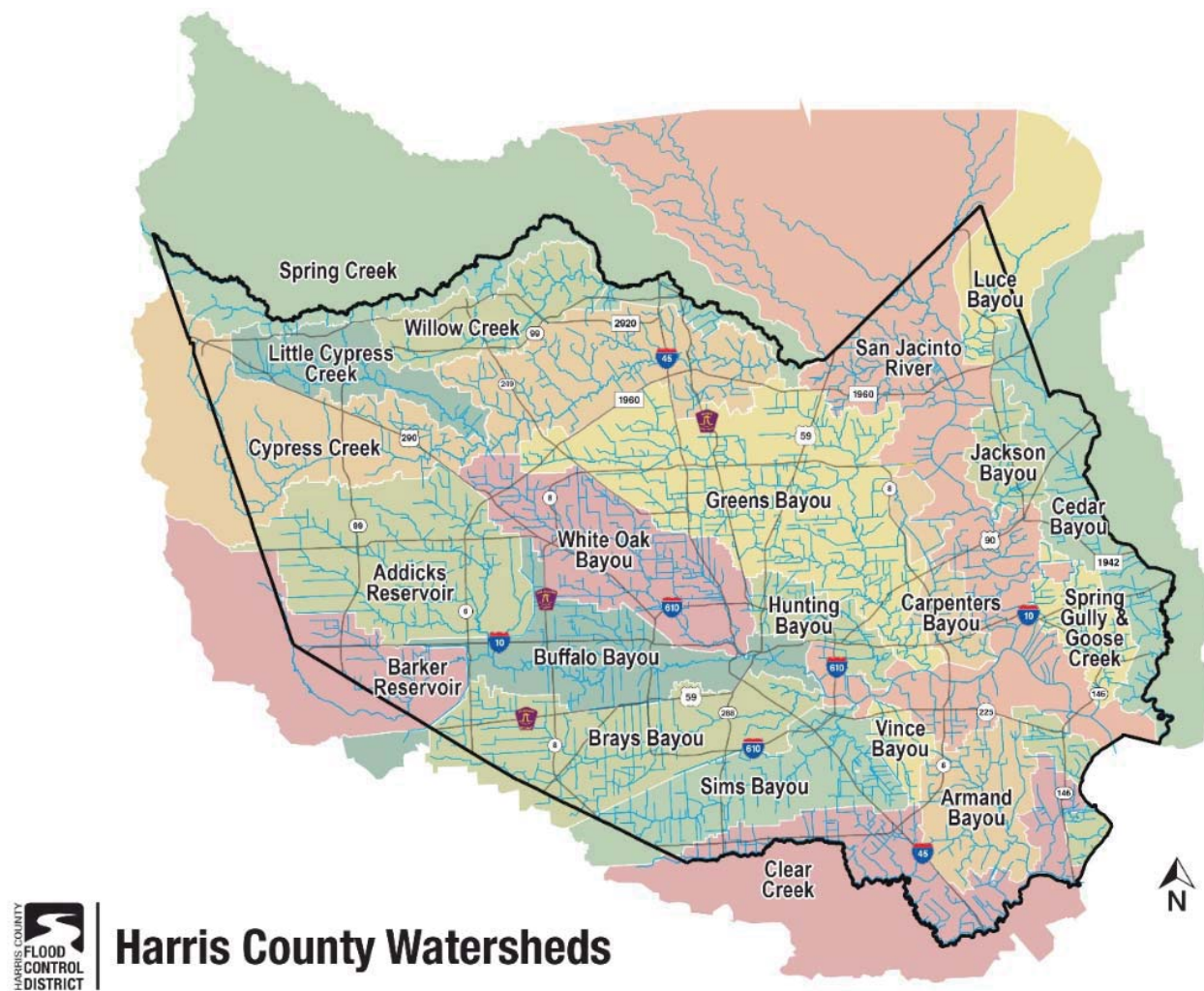


Figure 2.2: Harris County Watersheds [5].

² Part of the Barker Reservoir watershed is located in Fort Bend County.

2.3 Topography

The 2008 Light Detection and Radar (LiDAR) survey covering Harris County and surrounding areas (the entire watershed described above) was downloaded from “Houston Galveston Area Council” [8]. This survey also covers areas in Fort Bend County on the southwestern side of Barker Reservoir and was completed to support numerous GIS applications including flood modeling and prevention [9, pp. BAIRD0000294-345]. In addition, the 2014 LiDAR survey covering Fort Bend was downloaded from “StratMap 2014, Fort Bend LiDAR” [10]. The 2008 and 2014 LiDAR surveys were compared in overlapping areas within Fort Bend and found to be consistently similar.

2.4 Channel Bathymetry

An accurate representation of the topography and drainage network is essential for the accurate estimation of storage and routing of flows in the hydrodynamic model. LiDAR data define ground elevations above the water surface elevation in ponds and streams at the time the LiDAR was flown³. As such, channel bed elevations may not be represented by the LiDAR data.

The channel cross-section data provided by the Harris County Flood Control District (HCFCD) demonstrates this issue [11]. Figure 2.3 shows the LiDAR data shaded by elevation and the location of the HCFCD cross-sections as dashed lines. The water surface elevation at the time of the LiDAR survey was approximately 0 feet, NAVD88. The inset to the top right shows a profile view of the surveyed cross-section (highlighted in red in the main figure). The wetted portion of the channel from the HCFCD cross-sections, shaded in blue in the inset, was not captured during the LiDAR survey and was merged into the LiDAR-based Digital Elevation Model (DEM).

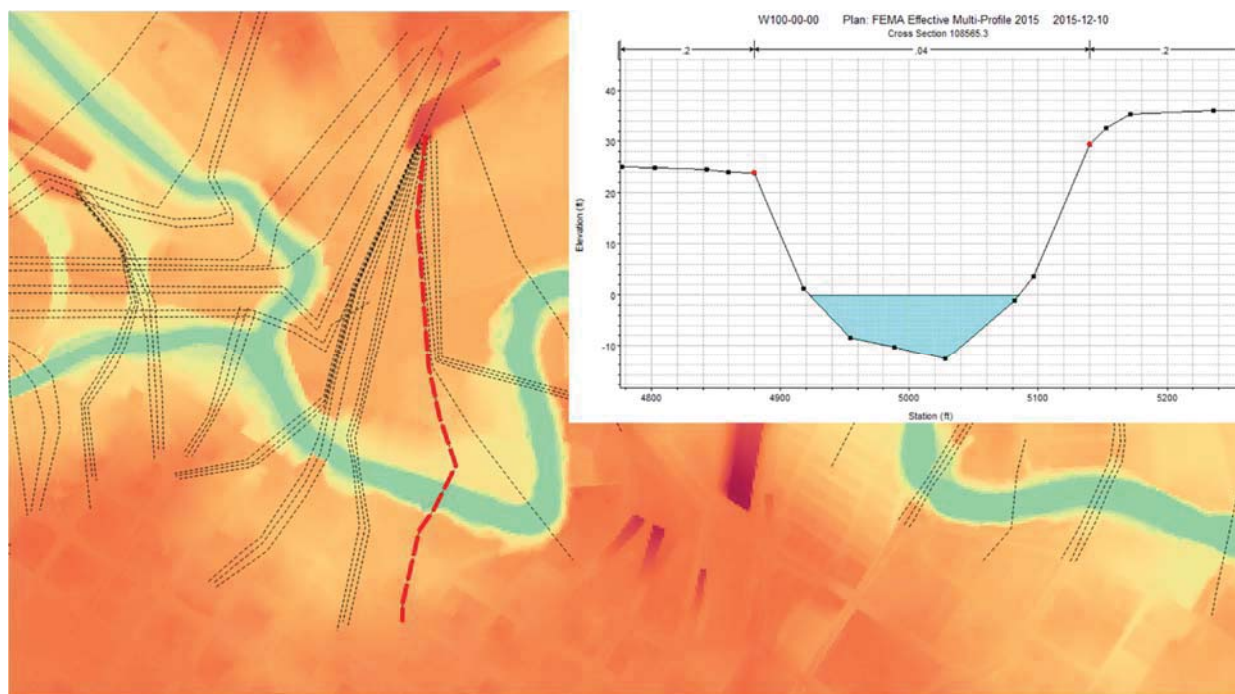


Figure 2.3: Example of 2008 LiDAR and HCFCD HEC-RAS data set.

³ Conventional LiDAR does not penetrate below the water surface.

2.4.1 HCFCD HEC-RAS Models and Cross Section Data

We addressed this channel bathymetry issue in two ways. First, we used the 237 HEC-RAS models developed by HCFCD for the Harris County region [11]. The one-dimensional HEC-RAS models consist of a series of cross-sections and related information (bridge and culvert details, channel and floodplain roughness, ineffective flow areas, etc.). The cross-sections were developed from a combination of field surveys (within the channel banks) and LiDAR data (floodplains).

A total of 146 HEC-RAS models were downloaded from HCFCD Model and Map Management (M3) System [11]. The downloaded models have a combined length of over 800 miles and include the main stem and tributaries of: Addicks Reservoir, Barker Reservoir, Brays Bayou, Buffalo Bayou, Carpenter Bayou, Cypress Creek, Greens Bayou, Hunting Bayou, Little Cypress Creek, San Jacinto River, Sims Bayou, Spring Creek, Vince Bayou, and White Oak Bayou. Models outside the Focus Area were not processed. Figure 2.4 and Figure 2.5 outline the streams that were acquired from [11] for upstream and downstream areas, respectively.

The HEC-RAS cross-sections upstream of Addicks and Barker Reservoirs are shown in red in Figure 2.6 and Figure 2.7, respectively. As shown in Figure 2.7, Upper Buffalo Bayou (located mostly in Fort Bend County) was not covered by the HEC-RAS cross sections. It is also noted that HEC-RAS cross-sections do not cover streams inside Addicks and Barker Reservoirs.

The HEC-RAS cross-sections for a portion of Buffalo Bayou, Turkey Creek, Rummel Creek, and other tributaries are shown in red in Figure 2.8. Lower Langham Creek (Addicks outlet) is not represented by the HEC-RAS cross-sections.

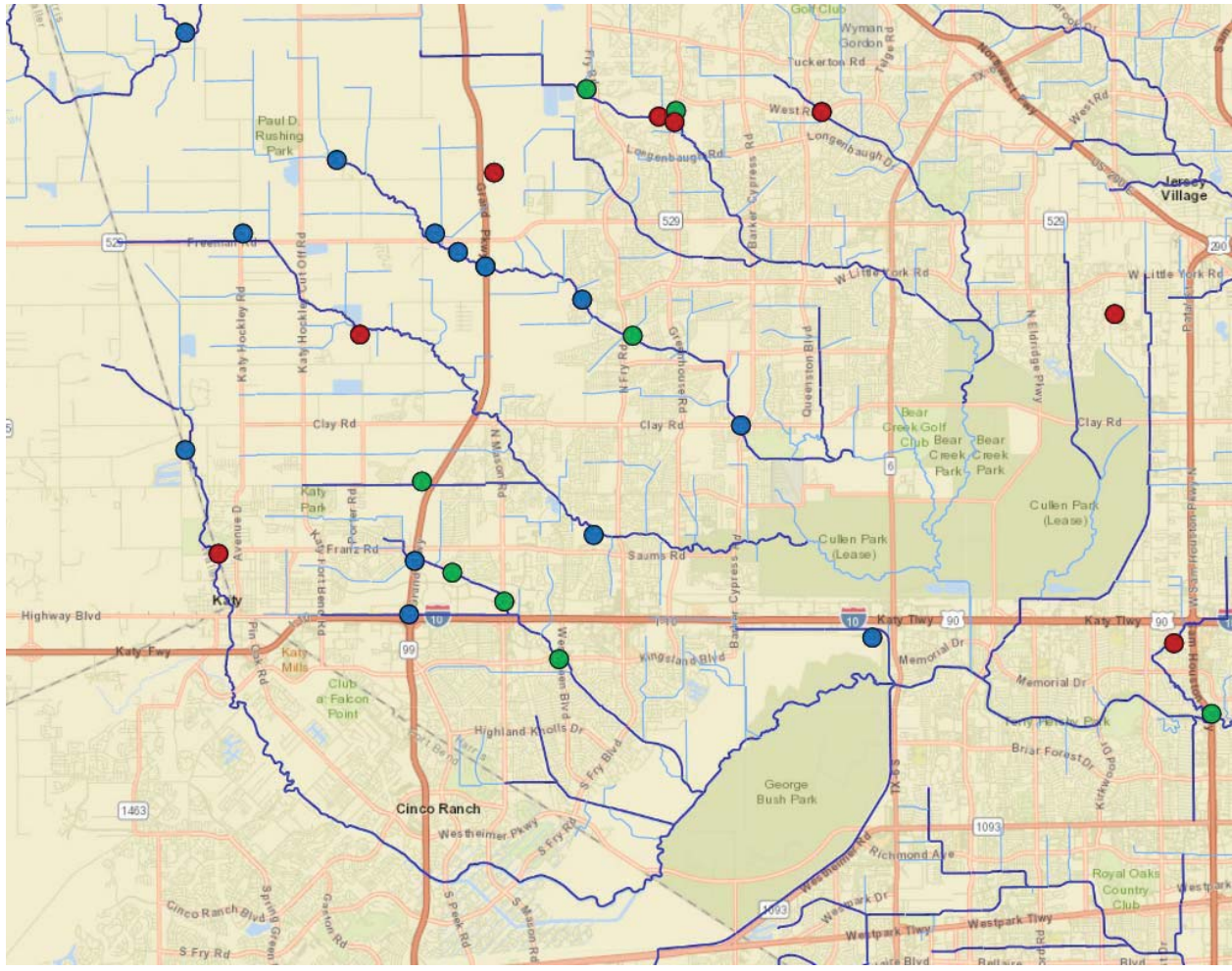


Figure 2.4: Streams within the Focus Area upstream of the dams (source: HCFCD M3, [11])⁴. Stream data acquired and utilized in the model are shown in dark blue. Other streams are shown in light blue.

⁴ Blue and Red dots outline ongoing changes to the models resulting from development projects. Red represents "Letter of Map Revision" and blue represents "Conditional Letter of Map Revision". "A Letter of Map Revision (LOMR) is FEMA's modification to an effective Flood Insurance Rate Map (FIRM), or Flood Boundary and Floodway Map (FBFM), or both" (<https://www.fema.gov/letter-map-revision>). "A Conditional Letter of Map Revision (CLOMR) is FEMA's comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA)." (<https://www.fema.gov/conditional-letter-map-revision>).



Figure 2.5: Streams within the Focus Area downstream of the dams (source: HCFCD M3, [11]). Stream data acquired and utilized in the model are shown in dark blue. Other streams are shown in light blue.

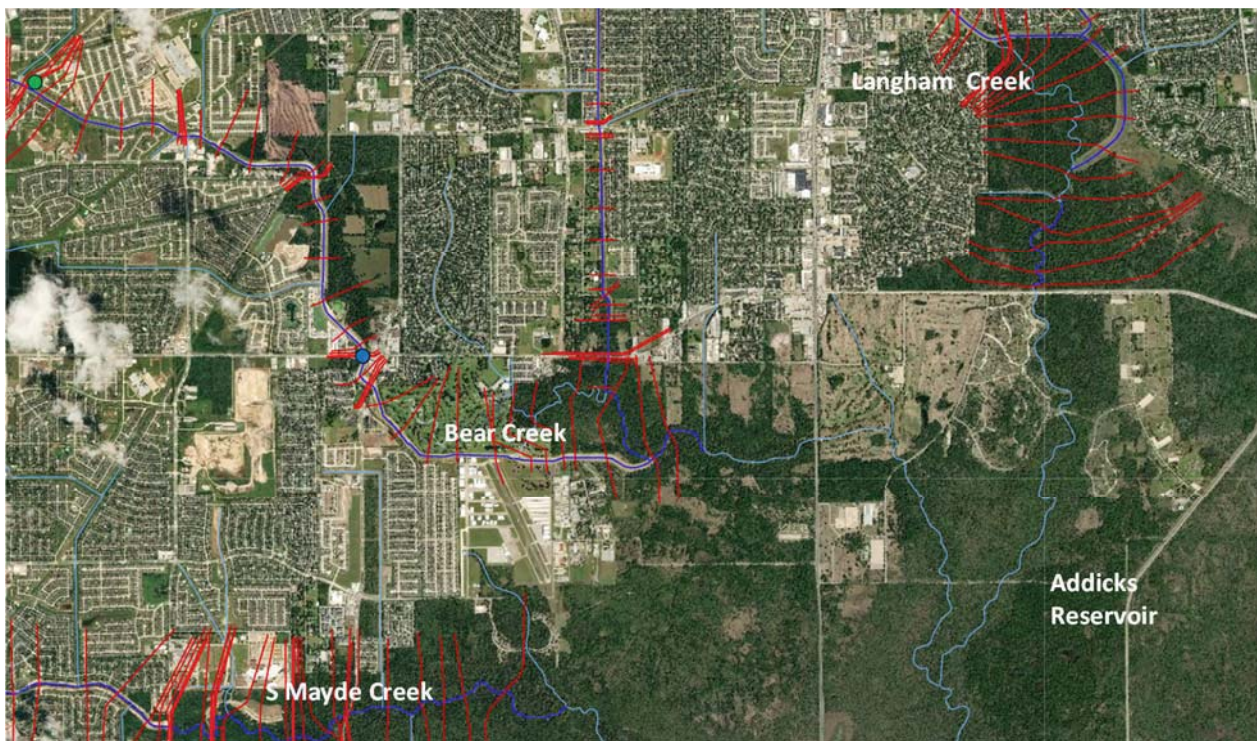


Figure 2.6: Examples of cross-sections from the HCFCD HEC-RAS models upstream of Addicks Reservoir [11].



Figure 2.7: Example of cross-sections from the HCFCD HEC-RAS models upstream of Barker Reservoir [11].

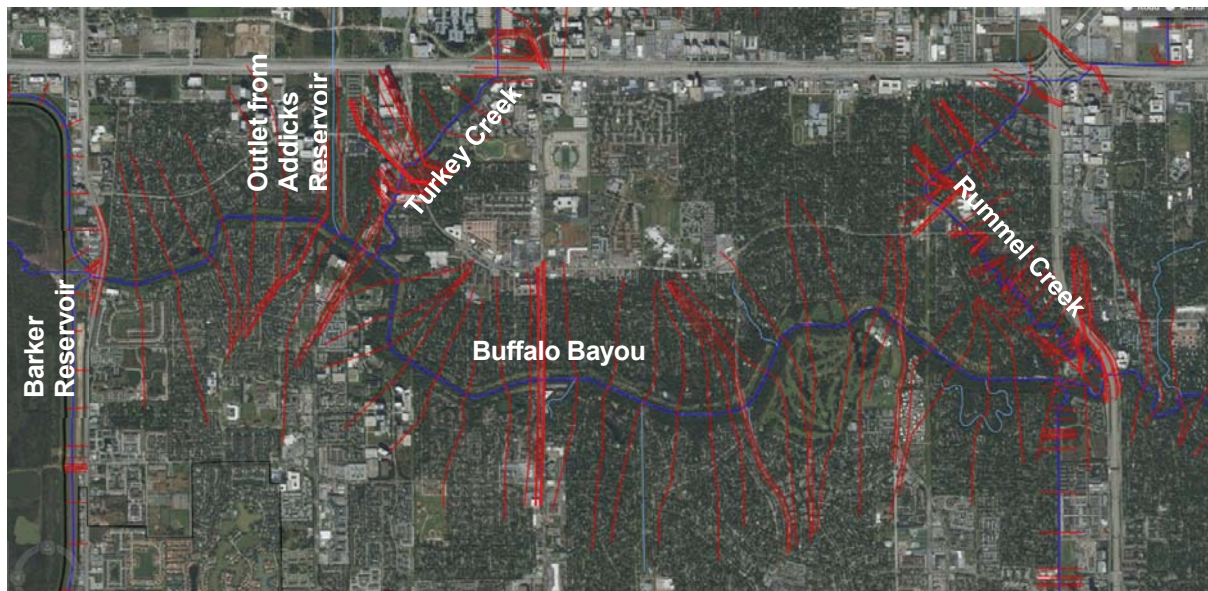


Figure 2.8: Example of cross-sections from the HCFCD HEC-RAS models [11].

2.4.2 2018 LiDAR Data

The topography of Lower Langham Creek (downstream of the Addicks outlets) is not covered by the HCFCD HEC-RAS models. The alternative to develop channel bathymetry was to rely on the 2018 LiDAR survey [12]. This LiDAR survey was conducted for the Corps, Galveston District between March 12 and 14, 2018 covering approximately 33 miles of the lower Buffalo Bayou [12]. During the period of the 2018 LiDAR survey, the estimated discharge in Lower Langham Creek was less than 50 cfs (based on estimated discharges at USGS Gage 08073100 [13]), which is a relatively small discharge, corresponding to a maximum depth of 0.8 feet [13]. Therefore, the 2018 LiDAR survey is expected to represent the bottom elevation of Lower Langham Creek reasonably well.

2.5 Addicks and Barker Project

Congress authorized the Addicks and Barker Dams project following the 1929 and 1935 flood events [7, p. USACE020188]. As part of the overall flood risk management project, Addicks and Barker Reservoirs assist in managing flood risk for the City of Houston and help prevent excessive velocities and silt deposits in the Houston Ship Channel Turning Basin [7, p. USACE020185].

Table 2.1 shows key dates of construction of relevance to the hydraulic study for Addicks and Barker Dams [7, p. USACE020189].

Table 2.1: Background of Structural Changes to Addicks and Barker Reservoirs.

Date	Construction Activity
Feb 1942 – Feb 1945	Barker Reservoir, conduits and one gate.
Aug 1945	Barker initial operation
May 1946 – Dec 1948	Addicks Reservoir, conduits and one gate.
Jun 1948	Addicks initial operation
Feb 1948 – Apr 1949	Two conduit gates added at each outlet.
Jan 1962 – Feb 1963	Gates added to the two remaining conduits at each outlet (for a total of 5 gated conduits at each outlet)
Jun 1986 – Aug 1988	Main embankments raised by 1-2 feet in Addicks [7, p. USACE020194] and 2-3 feet in Barker [7, p. USACE020195]
1998 – 1999	Outlet structure renovations including electrical work and gate repair.
2015 - Present	Ongoing construction of new outlets at Addicks and Barker.

2.6 Sediment Loads

Between the completion of the Addicks and Barker Dams project and the 1973-1975 reservoir re-surveys, there was no evidence of appreciable erosion in the watershed above the dams or serious sedimentation issues in the reservoirs [7, p. USACE020196]. Since 1975, sediment loads of the streams flowing into Addicks and Barker Reservoirs have substantially increased, which is attributed to construction activities associated with urbanization of the upper watershed [7, p. USACE020196].

2.7 Channel and Bayou Improvement Projects for Flood Reduction

Table 2.2 presents a summary of channel projects within the Focus Area approved by the federal government, including channel lining, rectification and diversion projects. The 1948 Rectification of Buffalo Bayou Project included straightening and widening of approximately 7.4 miles of the channel. Public opposition delayed another channel improvement project that was planned for Buffalo Bayou including concrete lining [7, p. USACE020190]. Table 2.2 shows approximate dates of these channel improvements (based on review of historic Google Earth satellite images).

The USACE permitted Harris County, Fort Bend County, and Willow Fork Drainage District to build seven major improvements on government owned reservoir land, as mapped out in Figure 2.9.

Table 2.2: Summary of Channel Projects within the Focus Area

Date Completed	Channel Project Description
Downstream Channels	
1948	Rectification of ~7.4 miles of Buffalo Bayou immediately downstream of the dams [7, p. USACE020190].
1971	Channel improvements for 25.4 miles of Brays Bayou (straightening and enlarging along with concrete lining) [7, p. USACE020190].
1975	Channel improvements for 10.7 miles of White Oak Bayou (straightening and enlarging along with concrete lining) [7, p. USACE020190].
1976	HCPCD excavated Turkey Creek Ditch below Addicks Dam [7, p. USACE020191].
1986 - 1988	Main earth embankments of Addicks and Barker Dams were raised to 121 feet and 113.1 feet, respectively [7, pp. USACE020194, USACE020195].
7 major upstream channel improvements (refer to Figure 2.9)	
1944 – 1977*	Willow Fork Creek Improvement – Stage 1
1944 – 1977*	Tributary 52.9 to Buffalo Bayou
1944 – 1977*	Drainage Improvement to Bear Creek Village
1977 – 1988*	Willow Fork Creek Improvement – Stage 2
1977 – 1988*	Willow Fork Diversion Channel
1977 – 1988*	Mason Creek Improvement
1977 – 1988*	Langham/Horsepen Creek Diversion
1995 – 2002*	Bear Creek Diversion

* based on review of historic Google Earth Images.



Figure 2.9: Seven major channel improvement projects upstream of and within Addicks and Barker Reservoirs.

2.8 Historical Storms and Floods

At the time of drafting the 2012 Water Control Manual [7], the maximum known flood on Buffalo Bayou was the 1935 flood [7, p. USACE002216]. During this flood, overflow occurred from White Oak Bayou into Buffalo Bayou, which overflowed into Brays Bayou [7, p. USACE002216]. The estimated peak flow rates in Buffalo Bayou were 40,000 cfs at Waugh Drive⁵ and 53,000 cfs at the confluence with White Oaks Bayou. The maximum recorded peak discharge in Buffalo Bayou, since establishment of gaging stations, was 14,000 cfs at Shepherd Drive in June 2001 [7, p. USACE002216]. A comparison between the Harvey Event and the 1935 flood is provided in Section 3.1.

⁵ Approximately 3.5 miles east of Highway 610, about 25 stream miles below the reservoirs.

2.9 Rainfall Data (Hurricane Harvey)

We downloaded precipitation data for the Harvey Event for 162 stations in hourly and 15-minute intervals from the Harris County Flood Warning System website [14]. We reviewed all the downloaded data and marked inconsistent records of rainfall data as missing data. We identified inconsistent records by comparing rainfall data at each station with neighboring stations and digitized locations of rainfall stations from the Harris County Flood Warning System (HCFWS) map [14].

In addition to gage data, Applied Weather Associates (AWA) applied the Storm Precipitation Analysis System to describe the rainfall during the Harvey Event using available sources [15]. The outcome of this analysis was provided as 60-minute rainfall data gridded at a spatial resolution of 0.01 seconds of latitude/longitude (approximately 1 km² resolution).

2.10 Wind Data (Hurricane Harvey)

As part of its Storm Precipitation Analysis System evaluation, AWA provided gridded wind data corresponding to the Harvey Event, where wind speed, direction and atmospheric pressure data were provided as gridded 60-minute data at a spatial resolution of 0.01 seconds (1 km²) [15].

2.11 Addicks and Barker Reservoirs

2.11.1 Objective of the Reservoirs

Addicks and Barker Reservoirs “were designed by the USACE to reduce flood flows downstream in Buffalo Bayou through the City of Houston” [16, p. USACE016461] and to protect urban development in the downstream floodplain [16, p. USACE016457].

When the reservoirs were completed by December 1948⁶, they were 15 miles west of the city limits of Houston [16, p. USACE016461]. Now, these reservoirs are part of the City of Houston and substantial urban development is located upstream and next to the federally acquired lands or GOL [16, p. USACE002356].

2.11.2 Reservoir Storage and Drainage Characteristics

As outlined earlier, the objective of the Addicks and Barker Dams is to reduce flood risks in the downstream floodplain [16, p. USACE016457]. As such, the Addicks and Barker Reservoirs are designed for short-term storage during storm conditions. The storage capacities of Addicks and Barker Reservoirs within the GOL are 127,591 acre-feet (41.6 billion gallons) [16, p. USACE016576] and 82,921 acre-feet (27 billion gallons) [16, p. USACE016578], respectively.

In the 1962 Reservoir Regulation Manual, the Corps estimated that the maximum non-damaging channel capacity downstream of the reservoirs was about 6,000 cfs [17, p. USACE599481]. At this rate, it takes 16 days for floodwater to discharge from the reservoirs if water surface elevation is at SPF elevations, assuming no additional rainfall and resultant runoff during releases [17, p. USACE599485]. The 2012 Water Control Manual states “present non-damaging channel capacity is approximately 3,000 cfs. Releases, when combined with uncontrolled runoff and outflow from Addicks and Barker Reservoirs, are limited to 2,000 cfs due to serious embankment problems and impacts to privately owned land.” [7, p. USACE020213].

⁶ Construction of Barker Dam was completed in February 1945 [7, p. USACE020189], while construction of Addicks Dam was completed in December 1948 [7, p. USACE020190].

2.11.3 Historical Pool Elevations

From the start of operation of the dams in 1948 until the time of drafting the Water Control Manual in 2012, the maximum impoundments behind the reservoirs occurred in March 1992 with pool elevations of 97.46 feet (Addicks) and 93.6 feet (Barker) [7, p. USACE002216]. Table 2.3 provides elevations in descending order for the top 12 significant pools for Addicks and Barker Reservoirs prior to the Harvey Event.

During Hurricane Harvey, pool elevations in Addicks and Barker Reservoirs reached 109.09 feet and 101.59 feet NAVD88 on the morning of 08/30/2017 exceeding the Standard Project Flood elevations (107.5 feet and 99 feet, respectively).

Table 2.3: Top 12 pool elevations for Addicks and Barker Reservoirs prior to the Harvey Event [7, pp. USACE002241-2]

Date	Pool Elevation at Addicks Reservoir (ft NAVD88)	Pool Elevation at Barker Reservoir (ft NAVD88)
25 – 29 Aug 2017 Harvey Event*	109.09	101.59
23 – 25 April 2016 Tax Day*	102.65	95.25
9 Mar 1992	97.46	93.60
30 Apr 2009	96.90	93.24
7 Nov 2002	96.45	92.31
17 Nov 1998	95.70	91.85
23 Oct 1994	95.63	91.69
31 May 2015* Memorial Day	95.52	91.87
15 May 1968	95.16	91.34
25 Nov 2004	94.88	91.21
8 Jul 2007	94.82	90.60
4 Sep 1981	94.25	90.58
17 Sep 1998	93.95	90.54

* Based on review of USGS gage data [13].

2.11.4 Releases

In accordance with the 2012 Water Control Manual [7, p. USACE020214], Section 7-05.b (Induced Surcharge Flood Control Regulation), *“At any time the reservoir pool equals or exceeds 101 feet NAVD 1988 in Addicks Reservoir and 95.7 feet NAVD 1988 in Barker Reservoir monitoring of pool elevation should immediately ensue to determine if inflow is causing pool elevation to continue to rise. If inflow and pool elevation conditions dictate, reservoir releases will be made in accordance with the induced surcharge regulation schedules shown on plates 7-03 and 7-04. The gates should remain at the maximum opening attained from the induced surcharge regulation schedules until reservoir levels fall to elevation 101 feet NAVD 1988 in Addicks and 94.9 feet NAVD 1988 in Barker. Then, if the outflow from both reservoirs when combined with the uncontrolled*

runoff downstream is greater than channel capacity, adjust the gates until the total discharges do not exceed channel capacity and follow the normal operating procedures.”

During the Harvey Event, it is our understanding that the Corps operated the Addicks and Barker dams in accordance with the induced surcharge schedule in the 2012 Water Control Manual. There were three distinctive phases to the releases from Addicks and Barker Reservoirs during the Harvey Event. In the first phase, between 8/28/2017 at 1:00 and 8/28/2017 at 8:00, the releases were increased to a combined rate of approximately 6,000 cfs. Between 8:00 on the 28th of August and 7:00 on the 29th there was only a small increase in the rate of combined release to 6,900 cfs. In the third phase, from 7:00 on the 29th until 15:00 that day, the release was increased to a combined rate of approximately 13,000 cfs. The first and third phases, where the releases were ramped up, resulted in two distinctive flood waves moving downstream through Buffalo Bayou. Table 2.4 summarizes the sequence of events during the Focus Period.

Table 2.4: Sequence of Events

Date	Rainfall [14]	Pool Elevations in Addicks / Barker (ft, NAVD88)	Gate Operation	Approximate Rate of Release from Addicks / Barker (cfs)*
8/20/2018 to 8/25/2017	Light scattered rain prior to Hurricane Harvey landfall	(87 to 67) / (84 to 72)	Gates partially open to empty the reservoirs and to release incoming inflows.	(0 – 200) / (0 – 200)
8/25/2017 am	Start of Harvey Event's rainfall (light rain)	67 / 72	Gates partially open to empty the reservoirs and to release incoming inflows.	(0 – 200) / (0 – 200)
8/25/2017 21:00	Light rain	72.4 / 72.9	Addicks gates closed	0 / 0
8/25/2017 22:00	Light rain	73.8 / 74.1	Barker gates closed	0 / 0
8/26/2017 am to 8/28/2017 am	Intense rainfall	(75 to 101) / (75 to 96)	Addicks and Barker gates closed	0 / 0
8/28/2017 1:00	Less intense rainfall	101.3 / 96.0	Start of gradual opening of Addicks gates (creates first flood wave)	(0 – 3000) / 0
8/28/2017 2:00	Less intense rainfall	101.7 / 96.3	Start of gradual opening of Barker gates (creates first flood wave)	(0 – 3000) / (0 – 3000)
8/28/2017 pm to 8/29/2017 am	Less intense rainfall	(104 to 107) / (98 to 100)	Gradual opening stopped, and gate position held for both sets of gates	3000 / 3000

8/29/2017 am to 8/29/2017 pm	End of rainfall around 8/29/2017 17:00	(107 to 109) / (100 to 102)	Gate opening resumed at both reservoirs (creates second flood wave) ⁷	7000 / 6000
8/30/2017 16:00	No measurable rainfall	109.1 / 101.5	Start of gradual closure of Addicks gates	< 7000 / 6000
8/31/2017 20:00	No measurable rainfall	108.7 / 100.9	Start of gradual closure of Barker gates	< 7000 / < 6000

* [7, p. USACE020314, USACE020315], [18], [19]

2.12 Plaintiffs and Test Plaintiffs

Figure 2.10 maps out the upstream and downstream Test Plaintiffs and major streams within the Focus Area. Inundation damages at the Plaintiffs' properties could have resulted from several factors as summarized below:

- Excessive runoff from local rainfall that overwhelmed the local storm drainage system;
- Backwater due to high water surface elevations in the receiving water body (such as pool elevations in Addicks or Barker Reservoirs);
- Backwater due to channel constriction in streams/bayous; and/or
- Release of floodwater from Addicks and Barker Reservoirs.

Table 2.5 provides a list of downstream Test Plaintiffs along with a general description of their properties' locations with respect to the dams and the major streams.

Table 2.6 summarizes results of land surveys completed at the upstream Test Properties [20].

Table 2.5: General description of downstream Test Properties.

Test Plaintiff	Location with respect to gages and water bodies
Aldred, Val & Linda	On the southern side of lower Turkey Creek.
Good Resources, LLC	On the eastern side of Lower Langham Creek.
Memorial SMC Investment 2013 LP	On the western side of Lower Langham Creek.
Milton, Arnold and Virginia	On the northern side of the rectified section of Buffalo Bayou between Highway 6 and Dairy Ashford Road upstream of the confluence with Lower Langham Creek.
Shipos, Jennifer	On the southern side of the rectified section of Buffalo Bayou between Highway 6 and Dairy Ashford Road upstream of the confluence with Lower Langham Creek.
Hollis, Wayne and Peggy	On the southern side of the rectified section of Buffalo Bayou between Highway 6 and Dairy Ashford Road downstream of the confluence with Lower Langham Creek.

⁷ Maximum release/flow rate during the Event was less than the maximum capacity of the conduits.

Silverman, Peter and Zhennia	On the southern side of the rectified section of Buffalo Bayou between Dairy Ashford Road and Beltway 8; much closer to Dairy Ashford Road; Downstream of the confluence with Lower Langham Creek.
Godejard, Arnstein and Inga	On the northern side of the rectified section of Buffalo Bayou between Dairy Ashford Road and Beltway 8; much closer to Dairy Ashford Road; Downstream of the confluence with Lower Langham Creek.
Cutts, Paul and Dana	On the southern side of Buffalo Bayou at the transition between the rectified and unrectified sections (~ 600 yards south of the Bayou) on the west side of Beltway 8.
Ho, Becky (No longer a Test Plaintiff)	North of Buffalo Bayou on the western side of Beltway 8
Beyoglu, Gokhan and Jana	On northern side of the unrectified section of Buffalo Bayou between Beltway 8 and Piney Point.
Azar, Phillip	On the northern side of the unrectified section of Buffalo Bayou near (downstream of) Voss Drive, between San Felipe and Shepherd Dr. gages (much closer to San Felipe).
Stahl, Timothy	On the northern side of the unrectified section of Buffalo Bayou near (downstream of) Voss Drive between San Felipe and Shepherd Dr. gages (much closer to San Felipe), near the confluence of Spring Branch Creek and Buffalo Bayou.
Welling, Shawn	On the northern side of the unrectified section of Buffalo Bayou approximately 1200 yards west (upstream) of Shepherd Dr.

Table 2.6: Results of land surveys at upstream Test Plaintiffs [20]

Plaintiff	Elevation (ft)					Source
	Lowest Grade	Garage	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor*	
Aldred, Val & Linda	78.9	80.1	79.4	80.6		US0000435
Good Resources, LLC	75.1	-	77.8	78.5	87.4	US0000430
Memorial SMC Investment 2013 LP	72.4	78.2	73.5	77.2	77.3	US0000426
Milton, Arnold and Virginia	76.3	78.6	78.0	78.5	78.6	US0000433
Shipos, Jennifer	78.2	80.5	80.2	80.9	-	US0000431
Hollis, Wayne and Peggy	74.5	76.7	75.2	76.6	-	US0000437
Silverman, Peter and Zhennia	73.4	75.2	74.4	75.0	-	US0000434
Godejord, Arnstein and Inga	68.5	73.5	72.8	73.7	-	US0000429
Cutts, Paul and Dana	68.8	71.1	69.9	71.7	-	US0000432
Beyoglu, Gokha and Jana	63.6	64.8	63.8	65.4	-	US0000428
Azar, Phillip	43.6	48.1	44.8	48.9	-	US0000438
Stahl, Timothy	55.0	55.4	55.2	52.1	55.9	US0000427
Welling, Shawn	36.1	46.8	37.3	36.0	47.4	US0000436

* Other finished floor elevation surveyed.

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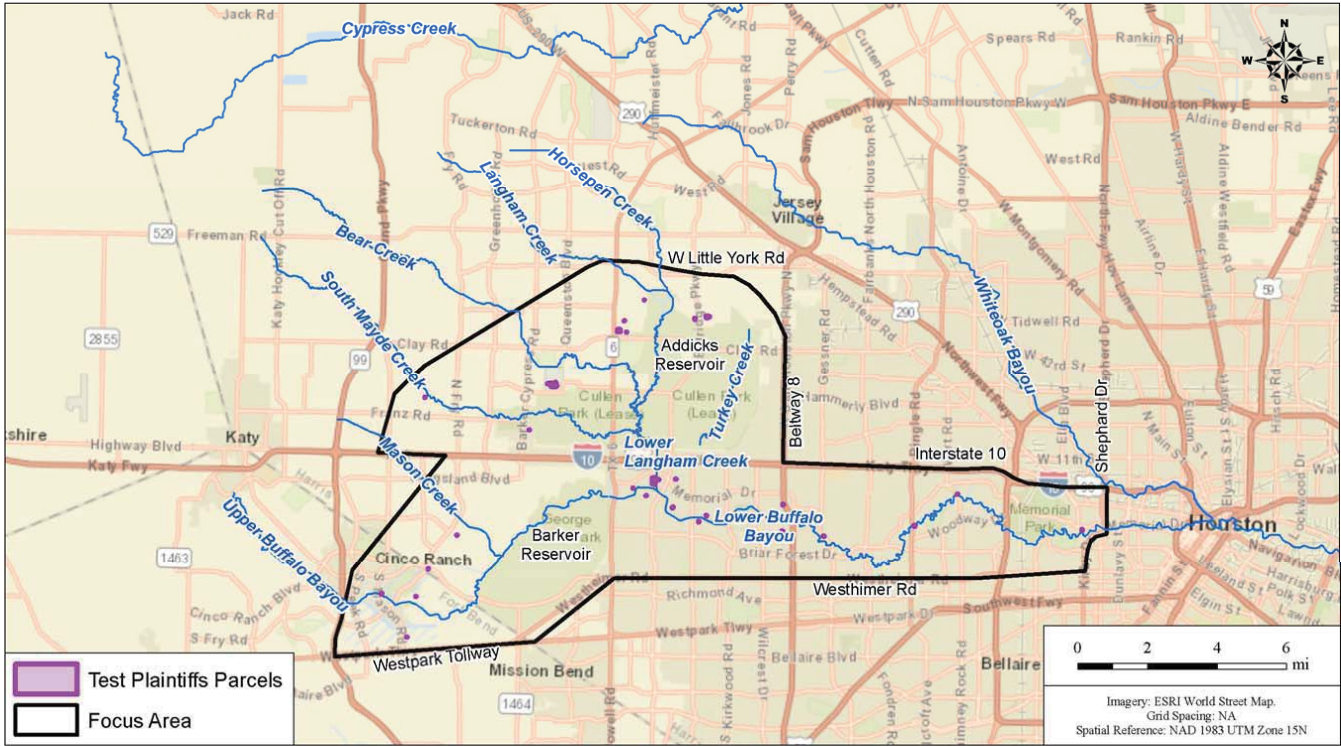


Figure 2.10: Focus Area vicinity map showing locations of Test Plaintiffs and major streams. Downstream Test Plaintiffs are identified in Figure 2.1.

Addicks and Barker Flood Control Reservoirs - Downstream Hydraulic Study
Expert Report of Dr. R. Naim (Downstream)

Baird.

3. Analysis of Physical Data

This section presents analysis of physical data collected during the Harvey Event (i.e. stream gage data) and historically (i.e. flow rating curves) to develop a general understanding of the flow regime during the event and to estimate general characteristics of the main streams within the Focus Area. Figure 3.1 shows locations of stream gages within the Focus Area which have been reviewed and analyzed in this section.

3.1 Inflow to Addicks and Barker Reservoirs

The Corps determined the Standard Project Flood (SPF) elevations based on a design flood that generates peak runoff inflows of 29,585 cfs and 22,405 cfs into Addicks and Barker, respectively (1962 Water Control Manual [17, pp. USACE599515-599516]). These peak inflows are greater than the estimated runoff during the 1935 flood, which was the storm of record at the time of designing the Addicks and Barker dams (refer to Table 3.1).

The capacity rating tables documented in the Corps' 2012 Water Control Manual [7] were used to estimate volume of floodwaters in the reservoirs during the Event. USGS measurements of pool elevations in Addicks and Barker Reservoirs [13] (USGS Stations 08073000 (Addicks) and 08072500 (Barker)) were used to define the free surface elevations in the reservoirs. We estimated the inflows to Addicks and Barker Reservoirs during the Harvey Event based on the mass balance within the reservoirs as two separate control volumes. The releases from Addicks and Barker Reservoirs were included in the mass balance; but floodwater stored upstream of the reservoirs (i.e. in upper tributaries and low-lying areas) was not included. As such, inflows estimated using this methodology are expected to be less than the peak flows generated upstream of the reservoirs during the Harvey Event. The spill around the north end of Addicks dam was not included in the mass balance. As such, inflows to Addicks Reservoir are slightly underestimated. The Harvey Event generated peak inflows of at least 72,000 and 88,000 cfs to Addicks and Barker Reservoirs, respectively, as shown in Figure 3.2. Harris County [4] reported a peak maximum inflow of 72,200 cfs into Addicks Reservoir during the Harvey Event, not including inflows from Horsepen Creek, which is consistent with the estimated inflows provided in Figure 3.2. As shown in Table 3.1, peak inflow rates generated during the Harvey Event are 2 to 4 times the 1962 SPF inflows.

In 1977, the Corps recalculated the SPF hydrographs for Addicks and Barker Reservoirs based on 50% of the Probable Maximum Precipitation (PMP) [21, p. USACE000549]. The revised SPF inflow hydrographs have peak inflow rates of 124,094 cfs and 86,961 cfs for Addicks and Barker Reservoirs, respectively. Although the estimated peak inflow rates during Harvey are smaller than the revised SPF, the Harvey inflow hydrographs are longer than the SPF duration. The calculated total cumulative inflows to Addicks and Barker Reservoirs during the Harvey Event are larger than the 1977 SPF, as shown in Table 3.1. Figure 3.3 and Figure 3.4 compare between inflow hydrographs under Harvey Event, 1962 SPF, 1977 SPF and 1935 flood for Addicks and Barker Reservoirs, respectively. Figure 3.5 and Figure 3.6 show estimated cumulative inflows to Addicks and Barker during Harvey Event, 1977 SPF and 1962 SPF.

The focus of our investigation relates to the hydraulic design and performance of the Addicks and Barker Reservoirs which is based on the SPF. Whereas the Spillway Design Flood (SDF) relates to the structural and geotechnical design of the embankments associated with the two reservoirs. The Corps noted in the 2012 Water Control Manual that the 1977 SDF produces "flow over the embankments of both dams" [7, p. USACE020212]. "The occurrence of this situation could create a condition favorable for considerable property damage to the public and the possible loss of life. Spillway Design Flood Impacts are currently being reanalyzed as part of a Dam Safety Modification Study and [the 2012 Water Control Manual] will be updated with results from the study after it is reviewed and approved." [7, p. USACE020212].

The maximum combined capacity of the Addicks and Barker release conduits is 16,586 cfs [16, p. USACE016577 and USACE016579], which is greater than the capacity of the receiving channel. Floodwater inflow rates to Addicks and Barker Reservoirs reached at least 160,000 cfs, which is an order of magnitude larger than the maximum combined capacity of the release conduits, leading to an unavoidable rapid rate of rise of pool elevations in Addicks and Barker Reservoirs. Due to the order of magnitude difference between the inflows to and outflows from the reservoirs, the pool elevations inside the reservoirs are not manageable without significant releases⁸ during events similar to the Harvey Event.

Table 3.1: Summary of design flood peak inflows compared to the Harvey Event peak inflows

Storms (listed according to severity from lowest to highest cumulative inflows)	Peak inflow to Addicks (cfs)	Peak inflow to Barker (cfs)	Total cumulative inflow to Addicks (Acre ft.)	Total cumulative inflow to Barker (Acre ft.)
1935 Flood [17, p. USACE599518, USACE599520]	23,000	17,915	82,727**	87,533**
1962 Standard Project Flood (SPF) [17, pp. USACE599515-599516]	29,585	22,405	85,414**	85,754**
100 year flood frequency [16, p. USACE016576 and USACE016578]			94,500	82,921
1977 Standard Project Flood [21, p. USACE000559]	124,094	86,961	193,956	125,061
Harvey Event*	72,000	88,000	250,000	200,000

* Peak inflows and total cumulative inflows are calculated based on volume of floodwater in the reservoirs and the released amount of water through the conduits. Estimates do not include water stored in upper tributaries and low lying areas upstream of the reservoirs and floodwater spilled around the north end of Addicks.

** Calculated based on digitized inflow hydrographs provided by the 1962 Reservoir Regulation Manual [17].

⁸ Significant releases exceeding the capacity of the release conduits and the receiving channels downstream of the dams.

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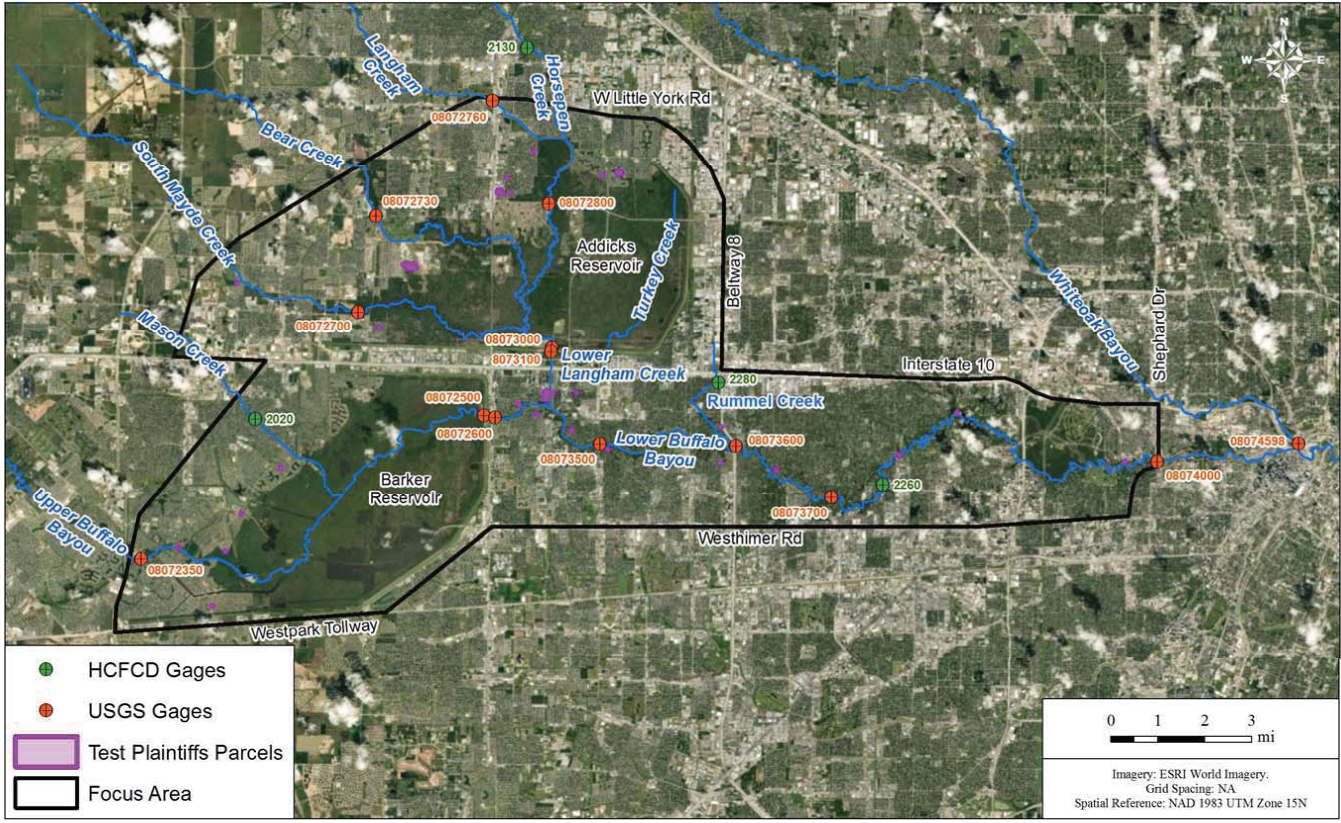


Figure 3.1: Stream gages within the Focus Area.

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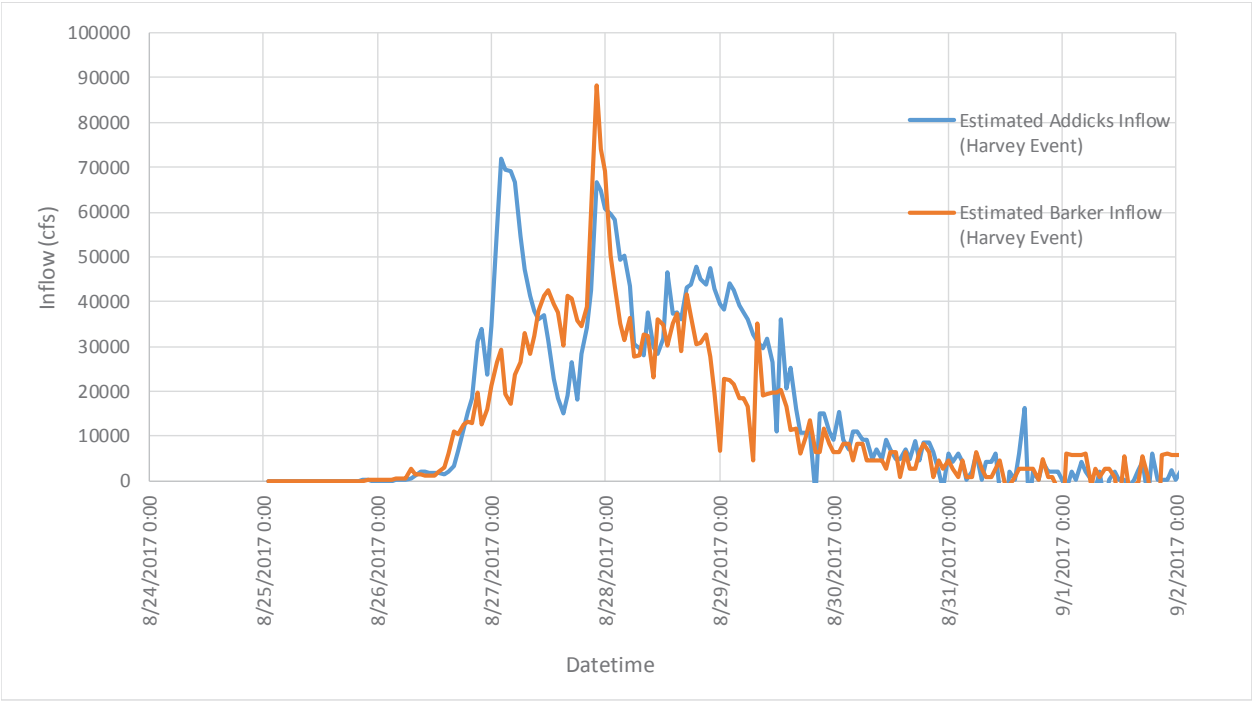


Figure 3.2: Addicks and Barker inflow hydrographs during Harvey Event.

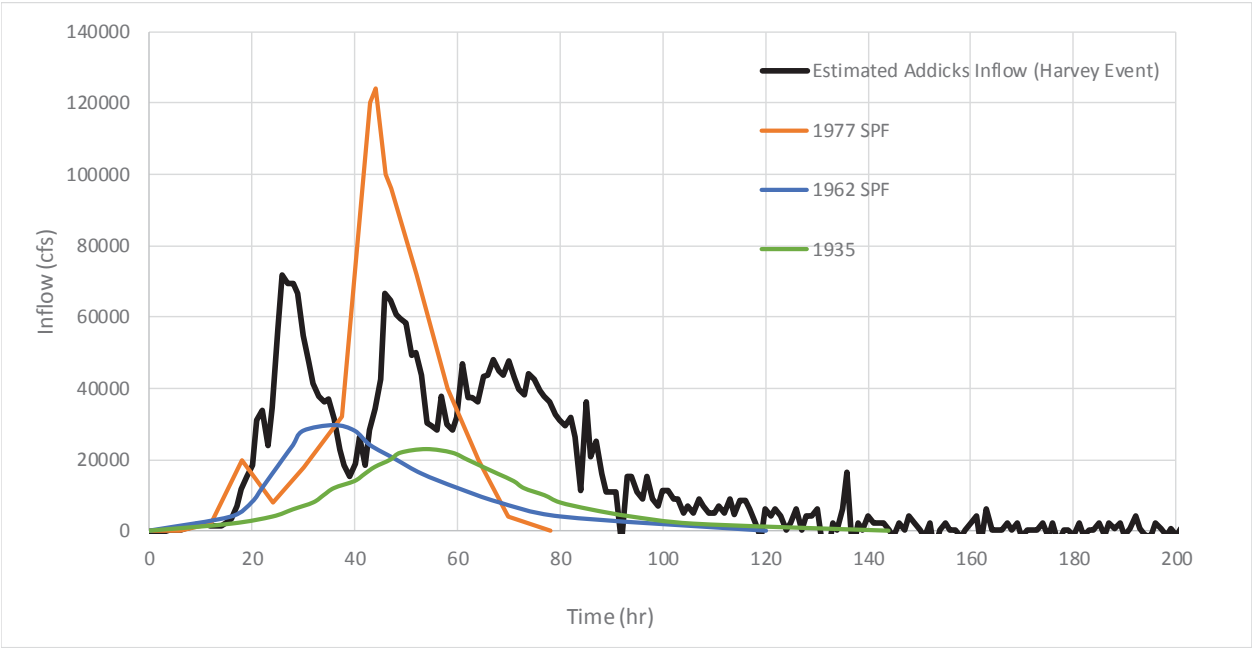


Figure 3.3: Harvey Event, 1977 SPF, 1962 SPF and 1935 event inflow hydrographs to Addicks Reservoir.

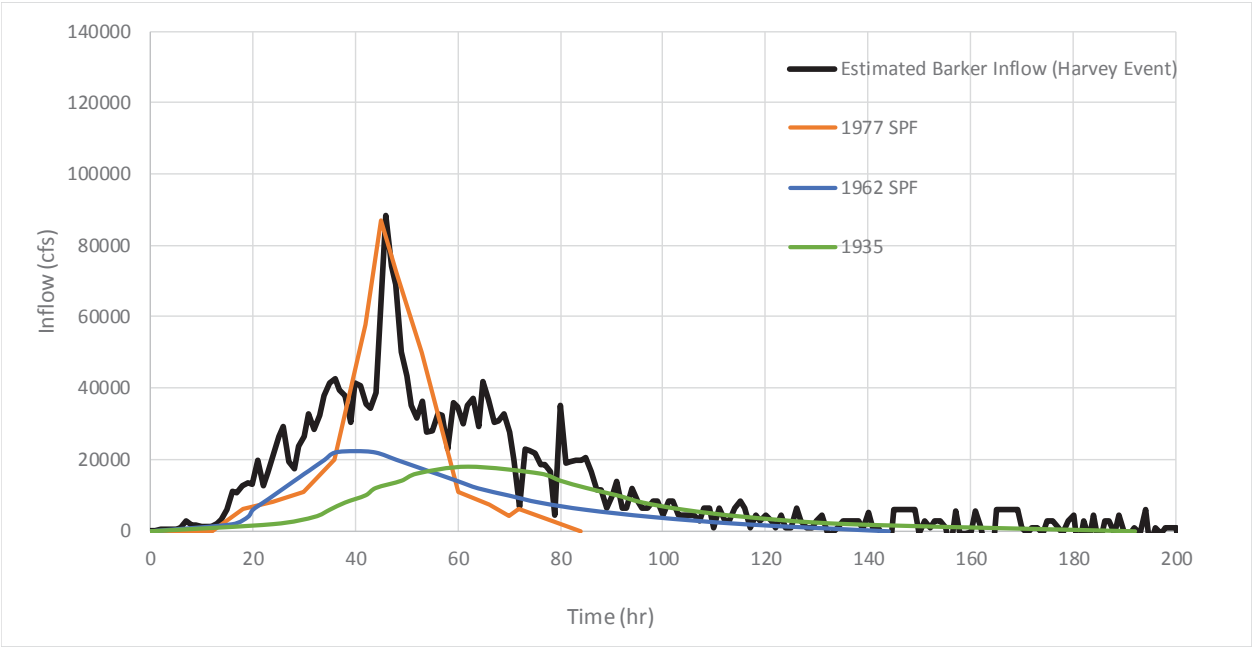


Figure 3.4: Harvey Event, 1977 SPF, 1962 SPF and 1935 event inflow hydrographs to Barker Reservoir.

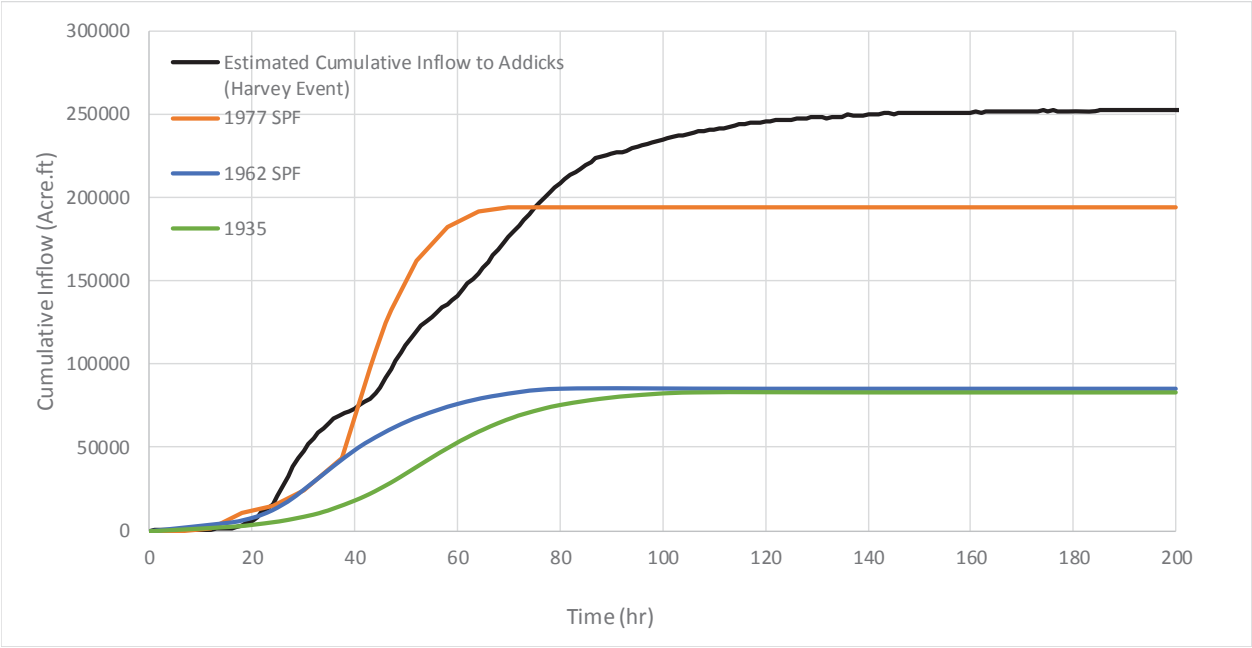


Figure 3.5: Cumulative inflow volumes to Addicks Reservoir (Harvey Event, 1977 SPF and 1962 SPF)

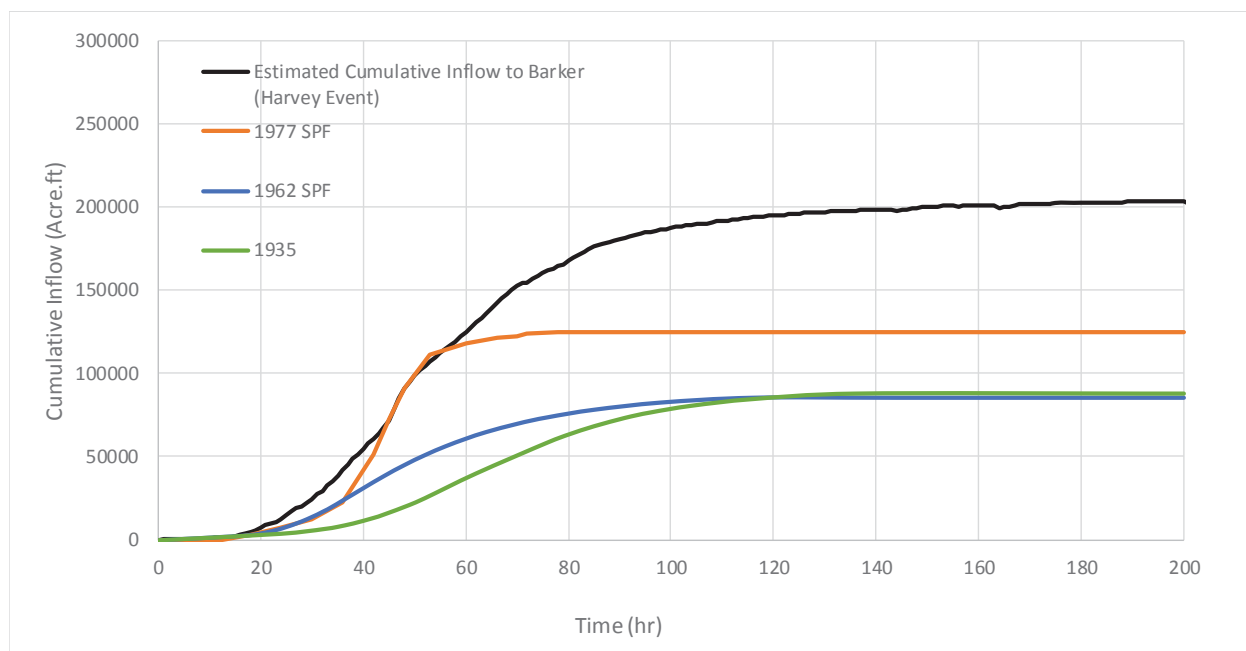


Figure 3.6: Cumulative inflow volumes to Barker Reservoir (Harvey Event, 1977 SPF and 1962 SPF)

3.2 Flow Regime Downstream of Addicks and Barker Dams

This section describes the flow regime downstream of the dams based on stage and discharge measurements at various gage locations prior to and during the Harvey Event.

3.2.1 Rainfall and Runoff Characteristics

Figure 3.7 presents USGS measured stage elevations along Buffalo Bayou downstream of the dams during the Harvey Event. It is noted that during the intense-rainfall period between 8/26/2017 am and 8/28/2017 am, there were no releases from Addicks and Barker Reservoirs. During this period, gage elevation rising trends were distinctively similar without space (between gages) or time lags. This is true for all the downstream gages within the Focus Area except the USGS gage 08074000 at Shepherd Drive, which features a very different pattern of response (as discussed below). Figure 3.7 shows that the Turning Basin Gage 08074710, located about 9 miles (stream distance) downstream of Shepherd Drive and about 5.7 miles downstream of the White Oak Bayou confluence, exhibits the same distinctive rising trend of gage elevations.

As noted above, unlike all other gages located upstream and downstream of its location, the measured stage elevations at the Shepherd Drive gage follow a straight line between 8/27/2017 16:00 and 8/28/2017 07:00, showing no correlation to the multiple intense rainfall peaks during this period. For runoff dominant flows, channel cross section differences along the Buffalo Bayou may impact the way stage elevations react to peak rainfall intensities but they would not impact the temporal correlation between rainfall intensity peaks and stage elevation peaks. This is true for all downstream gages considered except the Shepherd Drive gage. Therefore, measured stage elevations at the Shepherd Drive gage during the Harvey Event (or at least during the period between 8/27/2017 16:00 and 8/28/2017 07:00) are questionable and cannot be relied upon in the analysis.⁹

⁹ Pursuant to conversation with USGS, date/time of the peak elevation at Shepherd Dr is not accurate and will be changed. The peak elevation published is based on a surveyed high water mark (not from a logger).

The following sections investigate the possibility of backwater along lower Buffalo Bayou (downstream of the dams) within the Focus Area.

3.2.2 Profile of Lower Buffalo Bayou

Figure 3.8 shows inundation map and longitudinal profile of lower Buffalo Bayou downstream of the dams up to Highway 610 (within the Focus Area). In addition, the figure shows general channel attributes and water surface elevation profiles at 8/30/2017 derived from gage data and mapped high-water mark elevations¹⁰ extracted from the NOAA aerial image dated 8/30/2017 [22]. The inundation map clearly shows flow constriction at Sam Houston Tollway (Beltway 8) characterized by the more laterally expansive inundation upstream of Beltway 8. Beltway 8 is located less than ½ mile downstream of the end of the 7.4-mile channel rectification project in lower Buffalo Bayou, which included straightening and widening of the channel. The transition between the rectified section (with a larger flow capacity) and the natural section (with a lower flow capacity) of the Bayou acts as a constriction during high flow conditions, where the depth of flow increases in the rectified section due to backwater effects. Comparison between average slopes of the channel bed and the water surface profile slope along the channel confirm backwater conditions upstream of Beltway 8, where water surface slope is flatter than the channel bed, as shown in Figure 3.8. This is also evident as elevations of mapped high water marks located immediately upstream of Beltway 8 are higher than the height of the USGS Gage 8073600 located at the downstream side of the bridge.

Review of the stage-discharge rating curve at the USGS Gage 8073600 (Figure 3.9) confirms that lower Buffalo Bayou at Beltway 8 was backwatered during the Harvey Event before 9/8/2017 with flow discharges greater than 10,000 cfs. The stage-discharge rating curves represent uniform flow conditions through a certain section of the stream. Therefore, the rating curve is not valid during backwater conditions (i.e. non-uniform flow conditions), which is also pointed out by USGS [23]. Measured stages significantly higher than the rating curve indicate backwater conditions. Stage and discharge measurements on 8/30/2017 (71 feet and 13,900 cfs) and 9/5/2017 (68.14 feet and 11,800 cfs) are approximately 3.5 feet and 1.5 feet higher than the rating curve, respectively. As the flow receded below 10,000 cfs, stage elevations dropped to agree with the rating curve.

The capacity of the Bayou at various USGS gage locations was estimated based on stage-discharge rating curves provided by USGS [23]. Table 3.2 presents top of bank elevations extracted from various sources at the USGS gage locations and the corresponding top of bank stage discharge (or channel capacity, above which banks will be flooded). Table 3.2 and Figure 3.8 (see the last two rows of the table giving cross-sectional areas below the top of bank and below the inundation extent, respectively) show that the channel capacity drops significantly downstream of Beltway 8, which marks the end of the Buffalo Bayou rectification project. At Piney Point, the capacity of the Bayou is just 6,090 cfs.

Table 3.3 shows the timing of the measured peak stages and estimated peak discharges at USGS gages along lower Buffalo Bayou. It is noted that the earliest measured peak stage was at 8/27/2017 13:00 at the Piney Point gage (and around the same time at the HCFCD gage at San Felipe),¹¹ while the estimated peak discharge at the USGS gage at Piney Point was the latest, occurring at 8/31/2017 9:45. The early peak stage at Piney Point gage indicates the possibility of backwater upstream of this gage. This is physically supported by the fact that Piney Point represents a constriction to lower Buffalo Bayou, since the flow conveyance capacity of the Bayou upstream of this point is larger than its capacity at this location, as shown in Table 3.2.

The delayed peak discharge at Piney Point (at 8/31/2017 9:45) is due to backwater, as discussed above. However, the earlier peak estimated discharge at the Shepherd Drive gage (at 8/28 7:30, 3 days earlier than

¹⁰ Mapped high water mark elevations are the elevations of the mapped inundation limits as per NOAA aerial image dated 8/30/2017. More details are presented in Section 3.6.

¹¹ San Felipe gage is located approximately 2.2 miles downstream of the USGS gage at Piney Point.

the peak at Piney Point) cannot be explained by the same argument. As noted in Section 3.2.1, measured stage elevations at the Shepherd Drive gage cannot be relied upon (for this period of time). Since the estimation of discharges is based on the measured stage elevation and the stage-discharge rating curve, the estimated discharges at Shepherd Drive gage are also unreliable. The estimated peak discharge of 36,400 cfs at Shepherd Drive is significantly larger than peak discharges upstream of Shepherd Drive along lower Buffalo Bayou, as shown in Table 3.3. Despite the unreliability of estimated discharges at Shepherd Drive, measured discharges at this gage (which are not in question) are considered in the analysis. Figure 3.10 shows estimated¹² and measured discharges downstream of the dams up to Shepherd Drive (within the Focus Area). This figure shows measured discharges at Shepherd Drive of the same order of magnitude as measured and estimated discharges at other stations upstream Shepherd Drive along lower Buffalo Bayou.

Table 3.2: Buffalo Bayou Capacity Downstream of Addicks and Barker Dams and Measured Stages and Discharges during the Harvey Event

Gage No & location	Top of Bank Elevation (ft, NAVD88)	Top of Bank Stage Discharge (cfs) [23]	Peak Stage (ft) / Discharge (cfs) [13]****	Timing of start of flooding
08073100 Downstream of Addicks gates	79.9*	5,903	82.7 / 7,320	8/28/2017 23:45
08072600 at Hwy 6 downstream of Barker gates	78.5*	3,355	83.68 / 5,030	8/27/2017 21:30
08073500 at Dairy Ashford Road	73.2***	9,539	77.45 / 13,800	8/27/2017 9:45
08073600 at Hwy 8	62.2**	7,322	71.23 / 14,600	8/27/2017 0:15
08073700 at Piney Point	52**	6,092	63.94 / 15,000	8/26/2017 23:15
08074000 at Shepherd Dr.	28**	18,135	41.9 / -	8/27/2017 11:30

* Based on 2008 LiDAR survey [8].

** Based on NWS Flood Stage [24]

*** Based on Top of Bank data provided by HCFCD [23]

**** Peak stage and peak discharge are not concurrent.

¹² Estimated based on USGS rating curves provided by [23].

Table 3.3: Timing of Measured Peak Stages and Estimated Peak Discharges during the Harvey Event

Gage No & location	Peak Stage (ft) [13], [14]	Timing of Peak Stage	Peak Discharge (cfs) [13]	Timing of Peak Discharge
08073100 Downstream of Addicks gates	82.7	8/30 9:45	7,320	8/30 9:30
08072600 at Hwy 6 downstream of Barker gates	83.68	8/30 1:00	5,030	8/30 2:46
08073500 at Dairy Ashford Road	77.45	8/30 1:30	13,800	8/30 16:45
08073600 at Hwy 8	71.23	8/30 20:45	14,600	8/31 4:15
08073700 at Piney Point	63.94	8/27 13:00	15,000	8/31 9:45
HCFCD gage at San Felipe	59.89	8/27 12:53	N/A	N/A
08074000 at Shepherd Dr.	41.9	8/28 7:30	36,400	8/28 7:30

3.2.3 Prior to the Harvey Event

During the period from 8/24/2017 0:00 to 8/25/2017 12:00, there was no significant rainfall, as shown in Figure 3.7. Prior to closure of the gates on 8/25/2017 21:00 at Addicks and 22:00 at Barker, incoming flows from upper tributaries were released to lower Buffalo Bayou through the gates at Addicks and Barker. The resulting flow in lower Buffalo Bayou between the dams and Shepherd Drive was very low (less than 50 cfs) and nearly in a steady state (time invariant) between 8/24/2017 0:00 and 8/25/2017 12:00. Free water surface profile slopes between the USGS gages match the stream bed slopes during this period, which implies uniform flow without any significant backwater.

3.2.4 Gate Closure Period

During the gate closure period between 8/26/2017 am and 8/28/2017 am, the most intense rainfall of the Harvey Event was recorded (up to 2.5 inches per hour (in/hr)). Heavy rainfall on urbanized areas resulted in runoff which was the dominant contributor to flow in lower Buffalo Bayou during this period, as discussed in Section 3.2.1. Figure 3.7 shows that the stream bank along lower Buffalo Bayou up to Shepherd Drive was overtopped during this period (refer to black dashes representing top of bank elevations at respective gage locations). Similarly, at the Rummel Creek gage at Brittmoore Road, the gage elevation exceeded the top of bank elevation (54.3 ft)¹³ on 8/27/2017 4:13.

On the other hand, measured stage elevations downstream of the Addicks gates (USGS gage 08073100) were lower than the NWS flood stage elevation,¹⁴ indicating that the bank of the Lower Langham Creek was not significantly overtopped during this period.

¹³ Top of Bank elevation is provided by [14].

¹⁴ "The common definition [of the flood stage] is the stage at which overflow of the natural banks of a stream begins to cause damage in the local area from inundation (flooding)" [58].

3.2.5 Gradual Release Period

During the gradual gate release period, there were two flood waves generated by the two periods where releases were ramped up from Addicks and Barker Reservoirs. The first ramp up of release was approximately between 8/28/2017 1:00 and 8/28/2017 8:00, reaching a total estimated combined discharge of approximately 6,000 cfs. Between 8:00 on the 28th of August and 7:00 on the 29th there was only a small increase in the rate of combined release to 6,900 cfs. The second ramp up of release was approximately between 8/29/2017 7:00 and 8/29/2017 15:00, resulting in a total estimated combined increase in discharge of approximately 6,100 cfs, bringing the total combined release to approximately 13,000 cfs. During these two periods where release was ramped up, rainfall intensities were relatively low as the moderately intense rainfall period (between 8/28/2017 am and 8/29/2017 am) occurred between these two periods, as shown in Figure 3.7. As shown in Figure 3.10, the estimated discharge at the USGS gage at Dairy Ashford Road (08073500) distinctively represents these two flood waves, with the first flood wave starting at approximately 8/28/2017 5:00 (3 to 4 hours following the start of the first ramp up of release) and the second flood wave starting at approximately 8/29/2017 11:00 (2 to 4 hours following the start of the second ramp up). According to the 1962 Water Control Manual [17, p. USACE599479], it takes about 3.1 hours for peak flow to travel from Barker Reservoir to Dairy Ashford Road, which is similar to the observed travel time of these two distinctive flood waves. In addition, during the period of gradual release, less intense rainfall (less than 0.5 in/hr) was measured, which reduces the influence of runoff discharge on the travelling flood wave. Table 3.4 summarizes the flood wave characteristics during the Harvey Event at various gage locations along lower Buffalo Bayou. It is noted that the travel times of the two flood waves are generally in agreement with the 1962 Water Control Manual [17, p. USACE599479]. Differences (generally slower flood wave speed than documented) could be attributed to other flow contributors (such as runoff), backwater due to channel constriction at Piney Point and flooding of the banks. Flood wave speed over the rougher floodplain will be slower than flood wave speed within the bounds of the channel.

At the Beltway 8, Piney Point and San Felipe gages, increased discharges due to these two flood waves did not contribute to significant additional flooding, as shown in Figure 3.7.

At Lower Langham Creek downstream of the Addicks gates, gage elevation exceeded the bank elevation (79.9 ft)¹⁵ on 8/28/2017 23:45, after the first period of release ramp up but before the start of the second period of release ramp up from Addicks. Since the USGS gage is located immediately downstream of the Addicks gates, the impact of the first flood wave from Addicks on stage elevations at this gage location is expected to coincide with the timing of the release that triggered the wave (i.e. between 8/28/2017 1:00 and 8/28/2017 7:00). As shown in Figure 3.7, during the first period where release was ramped up from Addicks, stage elevation rose 1.1 ft from 77.5 ft to 78.6 ft, which was still lower than the elevation of the bank (79.9 ft).

Review of the discharge rating curve at USGS station 08073100 reveals that Lower Langham Creek was backwatered on 8/28/2017 due to high water surface elevations in Buffalo Bayou. The rating curve shown in Figure 3.11 shows that the stage and discharge measurement on 8/28/2017 11:56 (prior to the releases) is above to the curve¹⁶, where the measured stage was approximately 8 feet higher than the rating curve. Other measurements during the Harvey Event after the second flood wave (on 9/6/2017, 9/8/2017 and 9/11/2017) are in agreement with the rating curve, as shown in Figure 3.11.

Therefore, the start of bank flooding in Lower Langham Creek during the evening of 8/28/2017 is attributed to the following two factors:

- backwater in Lower Langham Creek prior to the release, which is caused by extensive runoff resulting in high water surface elevations in lower Buffalo (at the downstream end of Lower Langham Creek); and

¹⁵ Estimated based on DEM data since NWS flood stage (117.5 ft) seems to be erroneous.

¹⁶ Stage-discharge rating curves are invalid if the stream is backwatered.

- Continuous release from Addicks Reservoir.

The second flood wave contributed to another 2 feet rise in the gage elevation from 80 feet to 82 feet.

Table 3.4: Discharge Release Flood Waves during the Harvey Event

Gage Location	Timing of flood wave (beginning) First Wave / Second Wave	Timing of flood wave (end) First Wave / Second Wave	Approximate Travel Time** (hr) First Wave / Second Wave	Documented Travel Time (hr) [17, p. USACE599479]
Addicks Reservoir	8/28 1:00 / 8/29 7:00	8/28 7:00 / 8/29 14:00	0 / 0	
Barker Reservoir	8/28 2:00 / 8/29 9:00	8/28 9:00 / 8/29 15:00	0 / 0	
Dairy Ashford Road	8/28 5:00 / 8/29 11:00	8/28 18:00* 8/30 2:00	3-4 / 2-4	3.1
Highway 8	8/28 10:00* / 8/29 17:00	8/28 22:00* / 8/29 0:00*	8-9* / 8-10	6.4
Piney Point	8/28 11:00* / 8/29 23:00	8/31 0:00 / 8/31 8:00	9-10* / 14-16	10.2

* The moderately intense rainfall period between 8/28/2017 8:00 and 8/29/2017 0:00 may affect the timing estimate.

** Flood wave travel time from the Addicks and Barker Dams to the gage location is calculated based on the timings of the beginning of the flood wave at various locations.

3.2.6 Maximum Gate Release Period

During the period of maximum gate release from Barker Reservoir between 8/29/2017 17:00 and 8/31/2017 20:00, there was very little to no rainfall across the Focus Area. As such, flow through lower Buffalo Bayou was primarily due to the release from Addicks and Barker Reservoirs. The maximum combined release from Addicks and Barker Reservoirs during the Harvey Event was approximately 13,000 cfs. Following this period of maximum release, the combined discharge from Addicks and Barker was gradually decreased. Since the flow was primarily driven by the release (in the absence of rainfall and runoff), a nearly uniform flow condition along lower Buffalo Bayou (whereby estimated and measured discharges along lower Buffalo Bayou at various USGS gage locations are similar and of the same order as the combined release) would have been present under certain conditions including:

- flow pathway was strictly through lower Buffalo Bayou;¹⁷
- no backwater upstream of channel constrictions;
- no major flow contribution from other tributaries or storm drains; and
- after a certain period of time sufficient to convey runoff water generated by the earlier rainfall through all the stations.

Figure 3.10 shows that a nearly uniform flow condition occurred between Dairy Ashford Road and Piney Point Road starting from 9/5/2017 (i.e. at least 6 days after the rain stopped). As noted earlier, since the flow

¹⁷ Flow strictly through the channel can be assumed if free water surface is lower than the channel's bank elevation.

through lower Buffalo Bayou was not restricted to the channel (i.e. over bank flooding occurred), floodwaters were stored upstream of channel constrictions (such as Piney Point and Beltway 8) and in low laying areas. As a result, it took as long as 6 days to release the stored floodwater through the Piney Point constriction to establish a nearly uniform flow condition.

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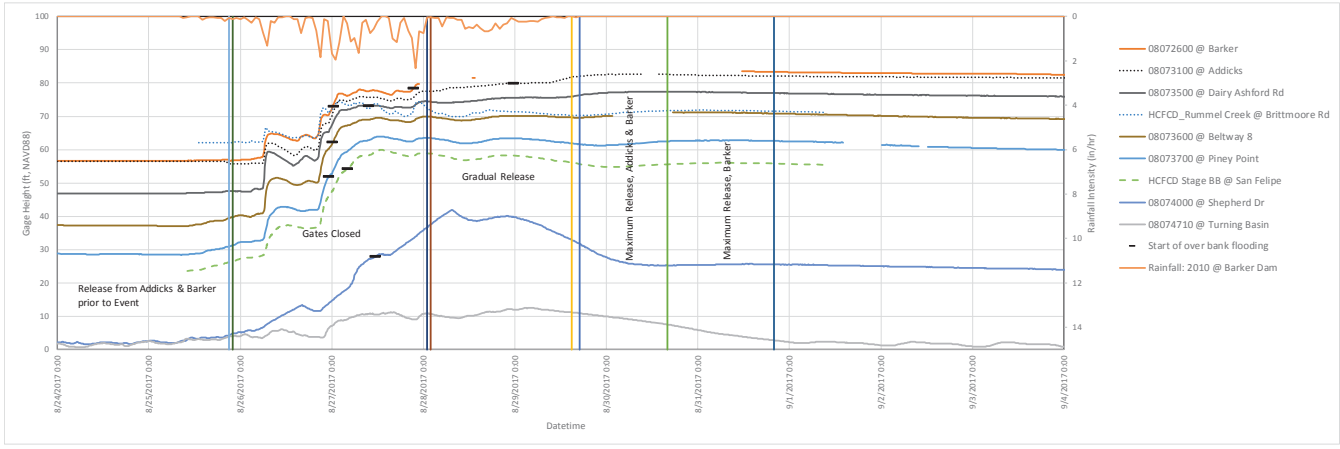


Figure 3.7: USGS gage elevations prior to and during the Harvey Event (data retrieved from [13] and [14]). Solid and dashed lines represent data along lower Buffalo Bayou. Dotted lines represent tributaries draining to lower Buffalo Bayou. Solid lines represent USGS gage data.

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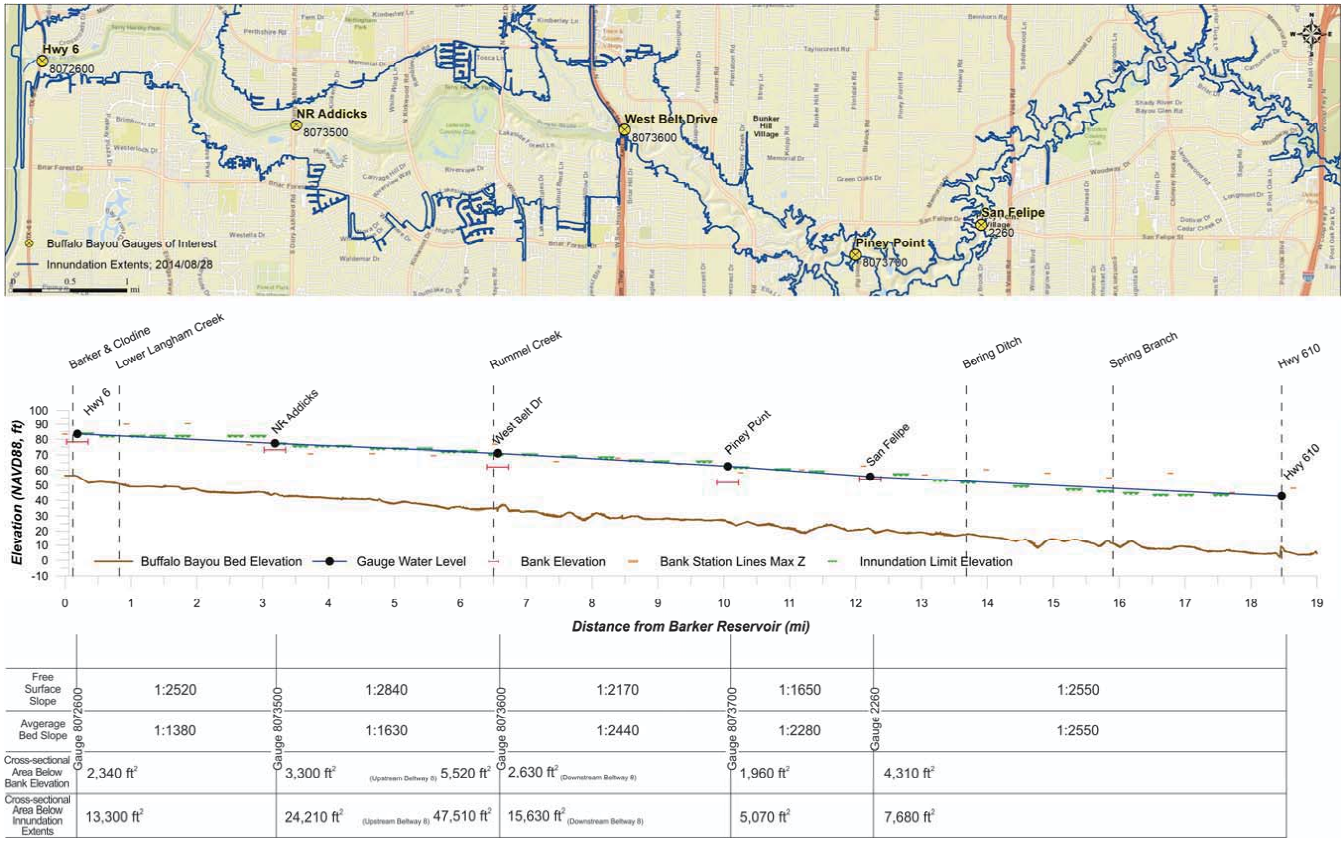


Figure 3.8: Lower Buffalo Bayou Stream Profile (sources: [8], [13] and [11])

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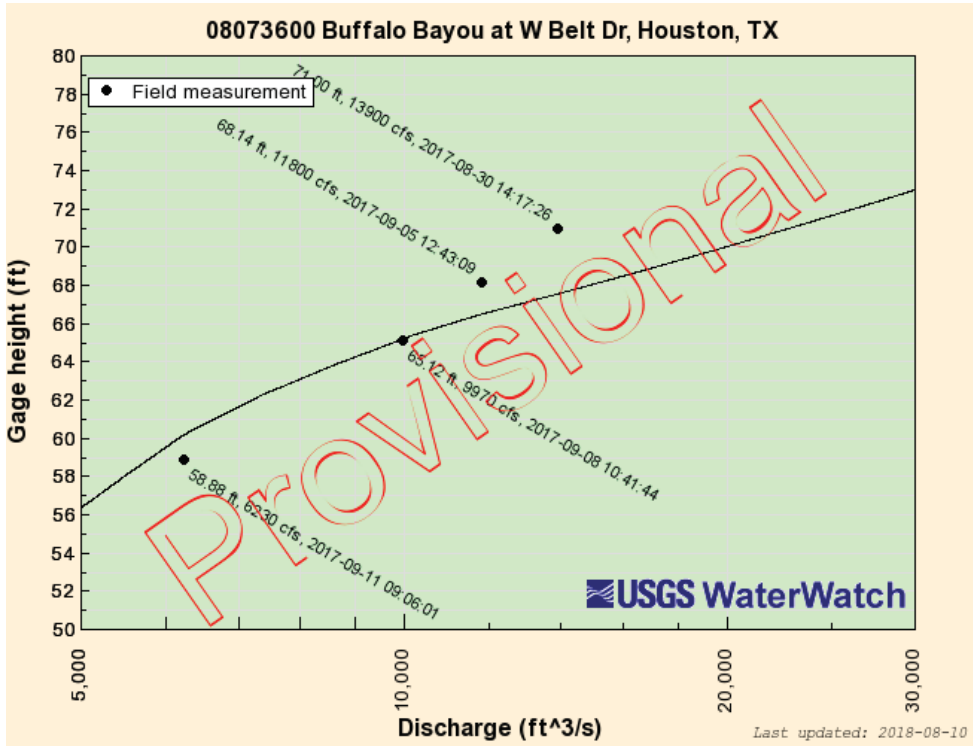


Figure 3.9: Discharge rating curve at USGS Station 08073600 at Beltway 8 [23].

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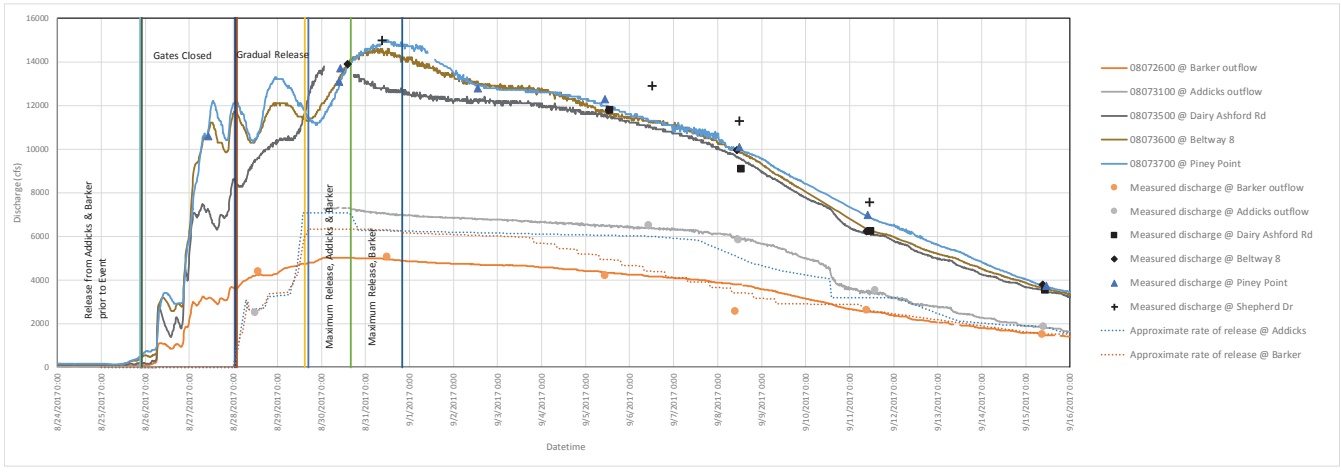


Figure 3.10: Estimated (solid lines) and measured (scatter points) discharges at USGS gage locations prior to and during the Harvey Event (data retrieved from [13]).

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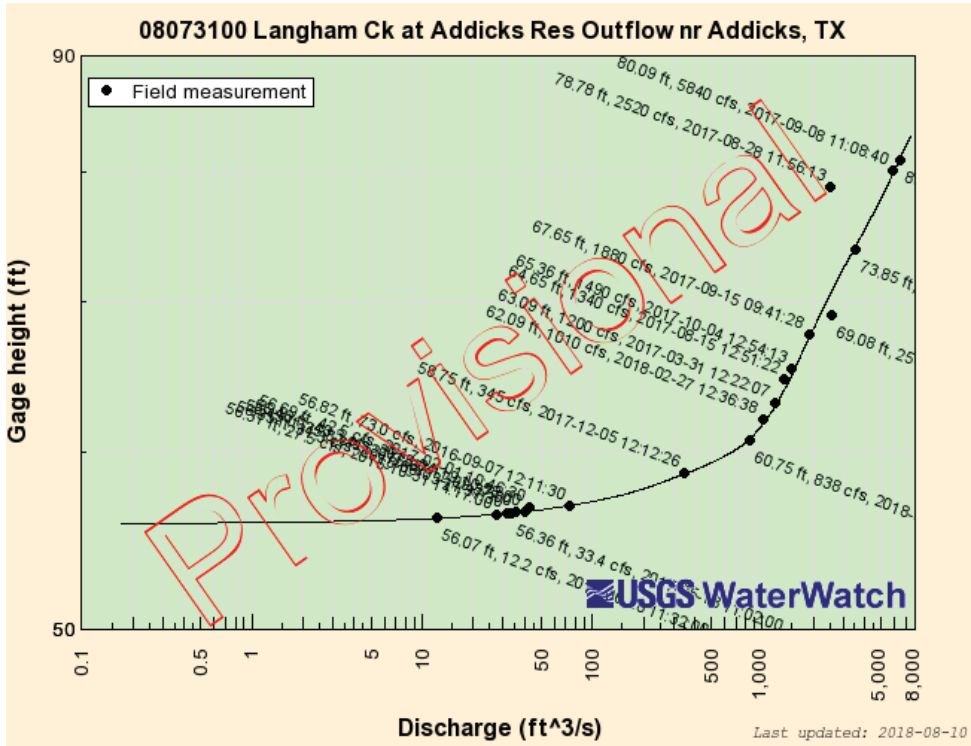


Figure 3.11: Discharge rating curve at USGS Station 08073100 on Lower Langham Creek [23]

3.3 USGS Rating Curves

The USGS maintains stage-discharge rating curves at various locations within the Focus Area. The curves provide a relationship between water surface elevation and flow discharge for a range of different elevations. These rating curves are periodically updated to account for recent discharge measurements and morphological changes. "Stage-discharge relations (ratings) are usually developed from a graphical analysis of current-meter discharge measurements (sometimes called calibrations) made over a range of stages and discharges. Measurements are made on various schedules and for different purposes. Each measurement is carefully made and undergoes quality assurance review. Frequently, measurements indicate a change in the rating, often due to a change in the streambed or riparian vegetation. Such changes are called shifts; they may indicate a short- or long-term change in the rating for the gage. In normal [usage], the measured shifts (or corrections) are applied mathematically to a defined rating. Ratings may be temporarily invalidated and unavailable due to backwater conditions caused by ice, tides, or other variable physical obstructions." [23]

The most up-to-date USGS rating curves are used throughout this study to estimate flow through streams under uniform flow conditions.

3.4 Estimate of Manning's Roughness based on Stream Gage Data

Under uniform and steady flow conditions, Manning's roughness coefficient n ($\text{m}^{-1/3} \cdot \text{s}$) for channels can be estimated based on the Manning's equation, below:

$$Q = 1.49(R^{2/3} \cdot A \cdot S^{1/2})/n$$

where Q is the discharge through the channel (cfs), A is the cross-sectional area (ft^2), R is the hydraulic radius (ft), and S is the slope of the energy grade line¹⁸. The following sections present estimates of the ranges of Manning's n values in Buffalo Bayou and its floodplain based on gage data and stage-discharge rating curves.

3.4.1 Manning's Roughness – Channel

Estimate based on physical characteristics of the channel

During our site visit on 3/6/2018, we observed that the rectified section of the lower Buffalo Bayou channel (downstream west of Beltway 8) is generally rougher than the unrectified section (downstream east of Beltway 8). The floodplain is heavily vegetated in the rectified section and there was evidence of debris build up due to fallen trees, as shown in Figure 3.12, Figure 3.13 and Figure 3.14. The floodplain of the unrectified section is less vegetated as shown in Figure 3.15.

Cowan (1956) developed a procedure for estimating the effects of various factors to define the value of Manning's roughness coefficient n for a channel based on the following equation [25]:

$$n = (n_b + n_1 + n_2 + n_3 + n_4)m$$

where

- n_b is a base value of n for a straight, uniform, smooth channel, which can be assumed to be 0.02.¹⁹

¹⁸ Under uniform flow the slopes of channel bed, free surface and energy grade line are equal.

¹⁹ Value provided by [25] after Chow (1959, [50]).

- n_1 is a correction value for surface irregularities. The rectified section of Buffalo Bayou can be assumed smooth with a correction value of 0.0, while a moderate degree of irregularity is assumed for the unrectified section with a correction value of 0.006 – 0.010 [25, p. 7].
- n_2 is a correction value for variations in channel cross section, which can be assumed gradual with a correction value of 0.0 [25, p. 7].
- n_3 is a correction value for the effect of obstructions. Appreciable obstructions²⁰ are assumed for the rectified section above Beltway 8 with a correction value of 0.02 – 0.030 (refer to Figure 3.12, Figure 3.13 and Figure 3.14). Minor obstructions²¹ can be assumed below Beltway 8 with a correction value of 0.005 – 0.015 [25, p. 7].
- n_4 is a value for vegetation in the channel. Within the channel, a small amount of vegetation is assumed with a correction value of 0.002 – 0.010 [25, p. 7].
- m is a correction factor for meandering of the channel. An appreciable degree of meandering is assumed above Beltway 8 (based on the ratio of the stream distance (about 6.5 miles) to the straight distance (about 5.3 miles)) with a correction factor of 1.15. Below Beltway 8 a severe degree of meandering is assumed with a correction factor of 1.3 (based on the ratio of the stream distance (about 15.75 miles) to the straight distance (about 9.1 miles)).

Based on the above, the Manning's n value for the rectified and unrectified sections of Buffalo Bayou are estimated to be in the range of 0.05 – 0.07 and 0.04 – 0.07 $m^{-1/3}$.s, respectively.



Figure 3.12: Debris build up in lower Buffalo Bayou upstream of the confluence with lower Langham Creek.

²⁰ Appreciable obstructions occupy 15 – 50 percent of the channel's cross section [25, p. 7].

²¹ Minor obstructions occupy less than 15 percent of the channel's cross section [25, p. 7].



Figure 3.13: Lower Langham Creek near the confluence with lower Buffalo Bayou. The channel bank separating the channel and the inner edge of the floodplain is distinctively defined by the edge of the grass. The photo shows a heavily vegetated floodplain and a less vegetated channel.



Figure 3.14: Lower Buffalo Bayou (rectified section) near Beltway 8 showing a heavily vegetated floodplain.



Figure 3.15: Lower Buffalo Bayou (unrectified section) near Briar Forest Drive showing a less vegetated floodplain.

Estimate based on other studies

A FEMA flood insurance study for Harris County includes ranges of Manning's n values, where n for the Buffalo Bayou channel is in the range of $0.02 - 0.06 \text{ m}^{-1/3} \cdot \text{s}$ [6, p. FEMA000249].

Table 3.5 presents values of Manning's roughness coefficients adopted by the Harris County HEC-RAS model [11], which shows that Manning's n for lower Buffalo Bayou ranges between 0.04 at Beltway 8 to 0.08 at Highway 6 (downstream of the Barker Reservoir gates).

Table 3.5: Manning's roughness coefficients adopted by the HCFCD HEC-RAS model [11].

Location	Channel Manning Roughness	Floodplain Manning Roughness
Highway 6	0.08	0.15 – 0.18
Dairy Ashford Rd	0.04	0.10 – 0.20
Beltway 8	0.04	0.15 – 0.20
Piney Point	0.06	0.20
Shepherd Drive	0.045	0.20
Langham Creek	0.035 – 0.04	0.10 – 0.20
Bear Creek	0.015 – 0.06	0.10 – 0.20
South Mayde Creek	0.04 – 0.055	0.10 – 0.20

Estimate based on gage data

As noted above, Manning's equation for flow applies to uniform and steady flow conditions, and therefore, under those conditions can be used to determine Manning's n with knowledge of the other flow variables of the equation. Gage data between Beltway 8 and Piney Point was reviewed for the period from August 13 to August 19, 2017 when flow was nearly uniform as characterized by very similar slopes for the water surface profile and channel bed. The Manning's roughness coefficient for the Buffalo Bayou channel was estimated for this period as shown in Table 3.6.

Table 3.6: Estimate of Manning's n based on Uniform Flow Calculations - Channel

Location	Measurement Date	Measured Stage & Q		Channel Characteristics		Average Bed Slope	Manning's n
		Stage (ft)	Discharge (cfs)	A (ft²)	R (ft)		
Reach between Dairy Ashford Road and Beltway 8						1:1630	
Dairy Ashford Road	8/15/2017 10:08	58.03	2550	738.5	8.26		
Beltway 8	8/15/2017 11:24	48.99	2510	643.4	6.53		
Calculated reach-average Manning's n representing rectified channel section (m ^{-1/3} .s)							0.038
Reach between Beltway 8 and Piney Point						1:2440	
Beltway 8	8/15/2017 11:24	48.99	2510	643.4	6.53		
Piney Point	8/16/2017 10:00	40.02	2570	867.2	7.02		
Calculated reach-average Manning's n representing unrectified channel section (m ^{-1/3} .s)							0.032
Beltway 8	1/26/2017 10:59	49.38	2460	677.8	6.88		
Piney Point	1/26/2017 12:06	40.28	2710	898.4	6.97		
Calculated reach-average Manning's n representing unrectified channel section (m ^{-1/3} .s)							0.033

3.4.2 Manning's Roughness – Floodplain

Estimate based on physical characteristics of the floodplain

Cowan (1956) developed a procedure for estimating the effects of various factors to define the value of Manning's roughness coefficient n for a channel. A modified procedure for floodplains is described in [25] as follows:

$$n = (n_b + n_1 + n_3 + n_4)$$

where

- n_b is a base value of n for the floodplain's natural bare soil surface, which can be between 0.025 and 0.032 for firm soil²².

²² Range provided by [25] after Benson and Dalrymple (1967).

- n_1 is a correction value for surface irregularities. The Buffalo Bayou floodplain within the focus area can be considered as slightly irregular in shape with a value of n_1 ranging between 0.001 – 0.005 [25, p. 9].
- n_3 is a correction value for effect of obstructions. During the Harvey Event, homes and buildings close to the floodplain were flooded. As such, those flooded properties were occupying part of the channel causing appreciable obstructions to the flow. Under these circumstances, n_3 value could range between 0.005 – 0.030 [25, p. 9].
- n_4 is a value for vegetation in the floodplain. During the Harvey Event, water surface elevations were as high as the upper branches of the trees within the floodplain of lower Buffalo Bayou. Therefore, the flow obstruction areas associated with tree canopies are much larger than those of tree trunks at lower elevations. A roughness value for an extreme amount of vegetation is in the range of 0.100 – 0.200 [25, p. 9].

Based on the above, the Manning's n for the floodplain of lower Buffalo Bayou within the focus area is estimated to be in the range of 0.131 – 0.277 $\text{m}^{-1/3}.\text{s}$.

Estimate based on other studies

A FEMA flood insurance study for Harris County includes ranges of Manning's n values and the Buffalo Bayou floodplain's n is in the range of 0.04 – 0.2 $\text{m}^{-1/3}.\text{s}$ [6, p. FEMA000249].

Table 3.5 presents values of Manning's roughness coefficients adopted by the Harris County HEC-RAS model [11], which shows that Manning's n for floodplains within the Focus Area is generally in the range from 0.1 to 0.2.

Estimate based on stage-discharge rating curve during the Harvey Event

During the Harvey Event, USGS measured stage elevations and discharges along Buffalo Bayou and calculated the necessary shifts to their rating curves. Under steady-uniform flow conditions, Manning's n can be calculated as described in Section 3.4.1. Downstream of the dams the USGS rating curves extend to elevations covering the floodplain allowing this method to be used to calculate the floodplain roughness²³.

During the Harvey Event, flow downstream of the dams was not restricted to the undeveloped floodplain, but rather flow through urbanized areas was experienced. Beretta et al. [26] demonstrated that enhanced friction can be effectively used to model flow over urbanized areas instead of representing detailed building geometry.

The USGS rating curves at Dairy Ashford Road and Piney Point were used to estimate Manning's n for the floodplains of lower Buffalo Bayou. Table 3.7 shows that Manning's n for the floodplains could be up to 0.24 $\text{m}^{-1/3}.\text{s}$. between the edge of the channel and the highest elevation of the rating curve.

²³ Upstream of the dams, steady-uniform flow conditions over floodplains are unlikely as floodplain inundation is mostly driven by backwater caused by high pool elevations in Addicks and Barker Reservoirs. Therefore, this method cannot be used to calculate floodplain roughness upstream of the dams.

Table 3.7: Estimate of Floodplain roughness based on Uniform Flow Calculations

Location	Elevation (ft, NAVD88)	Q (cfs) [23]	A* (ft ²)	P* (ft)	Full Cross-sectional area averaged n (m ^{-1/3} .s.)	Floodplain only n (m ^{-1/3} .s.)
Dairy Ashford	58 (channel)	2823.16	776	128	0.04 (channel)	0.04 (channel)
	76 (floodplain)	12316.29	15694	2259	0.18 (entire section)	0.22 (floodplain)**
Piney Point	36 (channel)	1851.54	491	137	0.02 (channel)	0.02 (channel)
	60 (floodplain)	13784.04	14907	1000	0.20 (entire section)	0.24 (floodplain)**

* Flow area (A) and wetted perimeter (P) are calculated based on extracted cross sections.

** Calculated from the difference between floodplain and channel values for Q, A and P.

3.5 Reservoir Rating Curves

Stage-capacity rating curves for Addicks and Barker Reservoirs are shown in Figure 3.16 and Figure 3.17, respectively. At relatively high pool elevations in the Addicks and Barker Reservoirs, small increments in pool elevations equate to significant additional amounts of floodwater stored in the reservoirs. During the Harvey Event, peak elevations in Addicks and Barker Reservoirs reached 109.09 feet and 101.59 feet [13], respectively, corresponding to a total stored volume of floodwater of at least 127 billion US gallons (390,000 acre-feet) without accounting for floodwater stored in detention ponds and upper tributaries. Without these reservoirs, this amount of floodwater would have been routed to areas downstream causing devastating flooding.

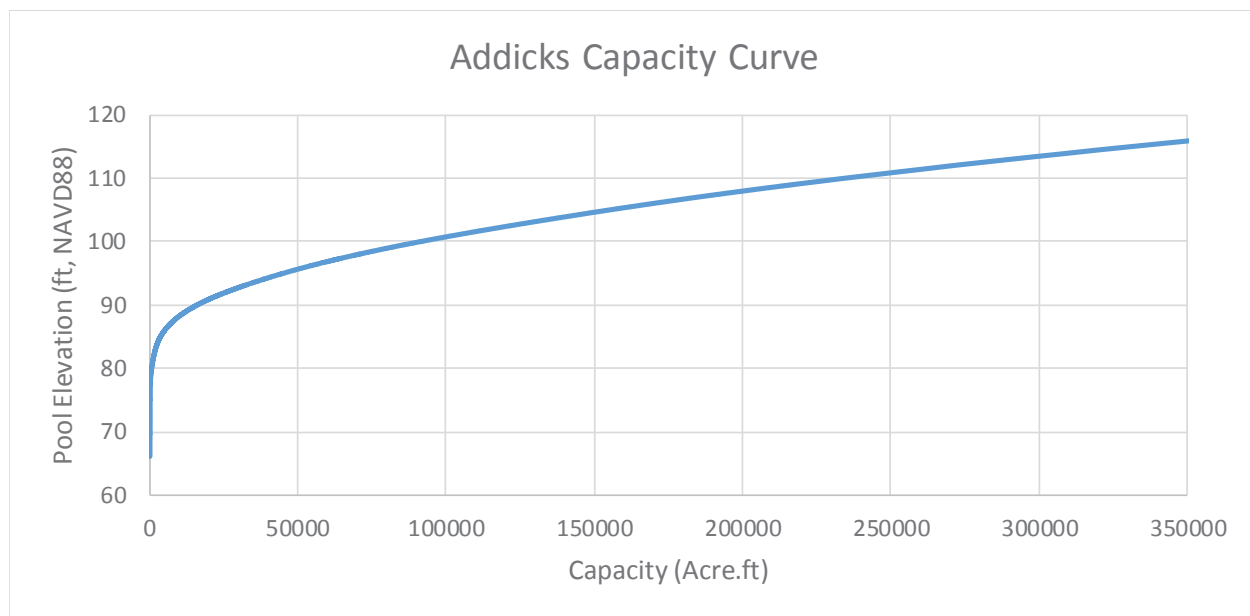


Figure 3.16: The Addicks stage-capacity rating curve (Source: 2012 Water Control Manual [7, p. USACE020232 to 020256])

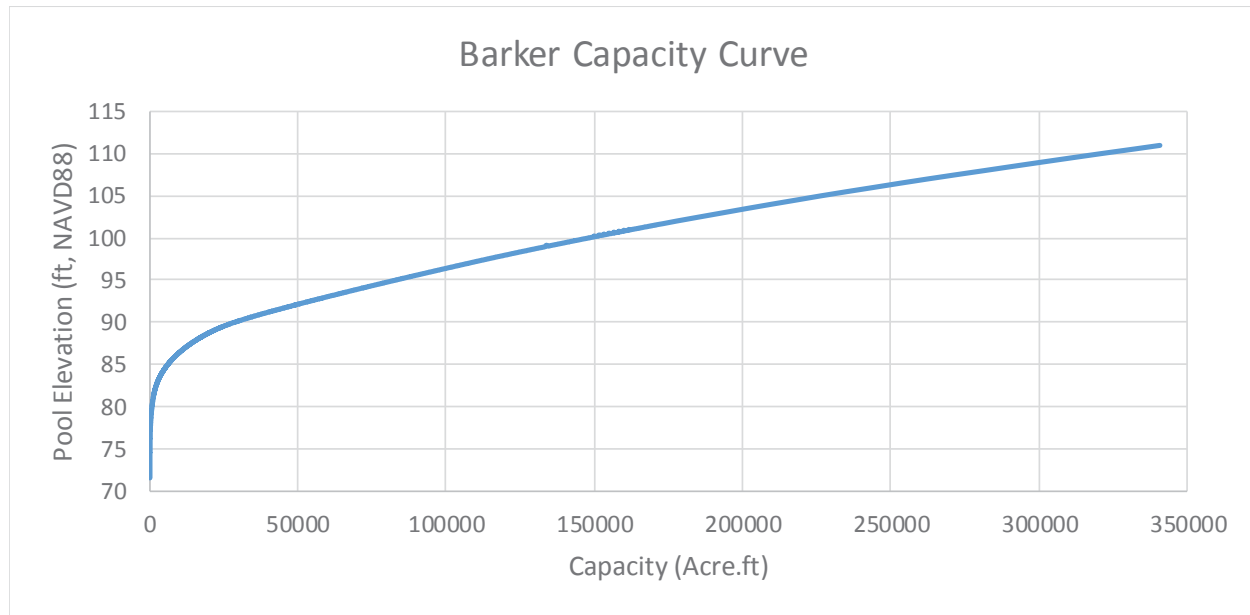


Figure 3.17: The Barker stage-capacity rating curve (Source: 2012 Water Control Manual [7, p. USACE020257 to 020276])

3.6 Inundation Mapping

Maps showing observed high water marks (shoreline) based on the NOAA mosaic aerial photos dated 8/30/2018 are shown in Figure 3.18, Figure 3.19 and Figure 3.20 for areas downstream and upstream of the Addicks and Barker Reservoirs. These aerial photos were acquired between 17:13 and 18:19 on 8/30/2018. The observed inundation limits on that day within the Focus Area were recorded as discrete lines. A continuous "shoreline" representing the observed inundation limit was developed by selecting elevation contours that matched those observed limits. Because maps presented in Figure 3.18, Figure 3.19 and Figure 3.20 represent observed inundation limits on a specific date (8/30/2017), they may not represent the maximum inundation limits during the Harvey Event.

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Figure 3.18: Tracked high water mark below Addicks and Barker Dams based on NOAA mosaic aerial image dated 8/30/2018 (taken between 17:13 and 18:19)

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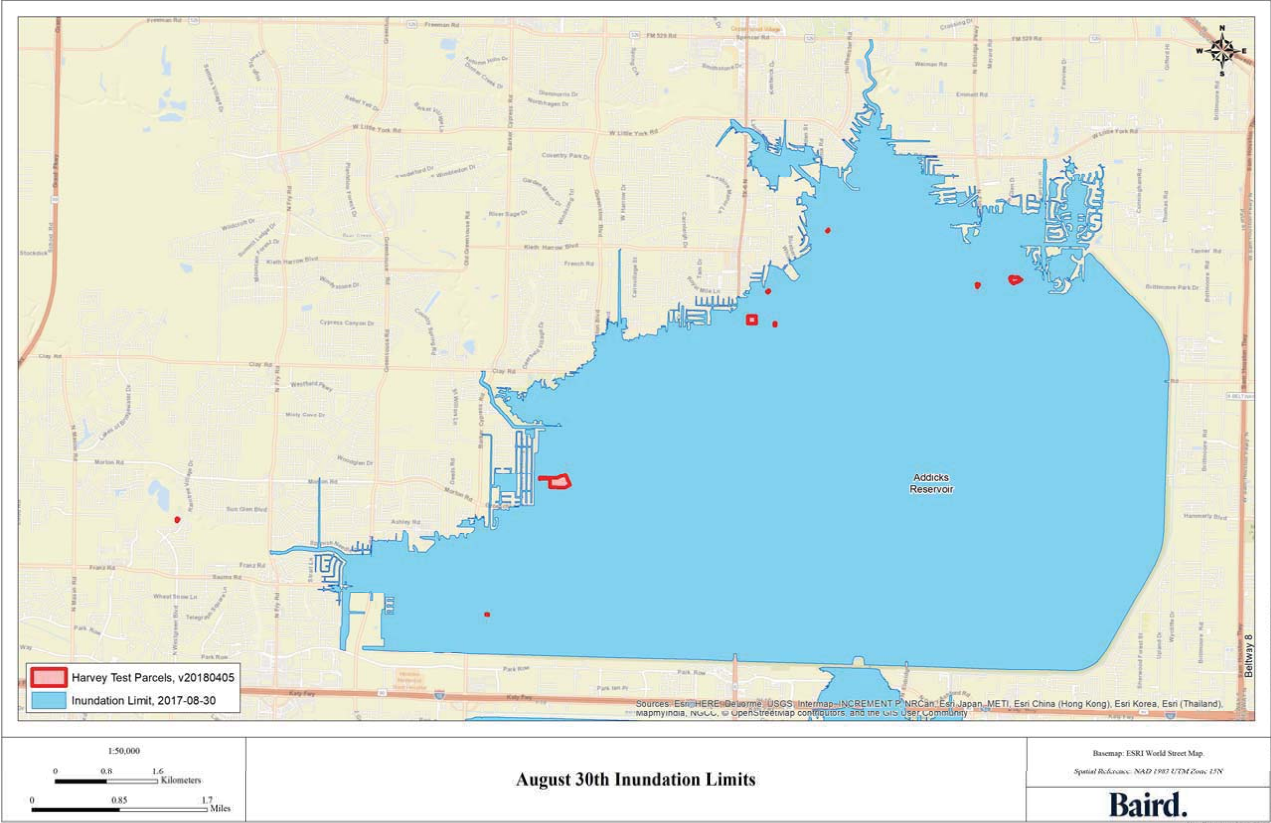


Figure 3.19: Tracked high water mark upstream of Addicks reservoir based on NOAA mosaic aerial image dated 8/30/2018 (taken between 17:13 and 18:19)

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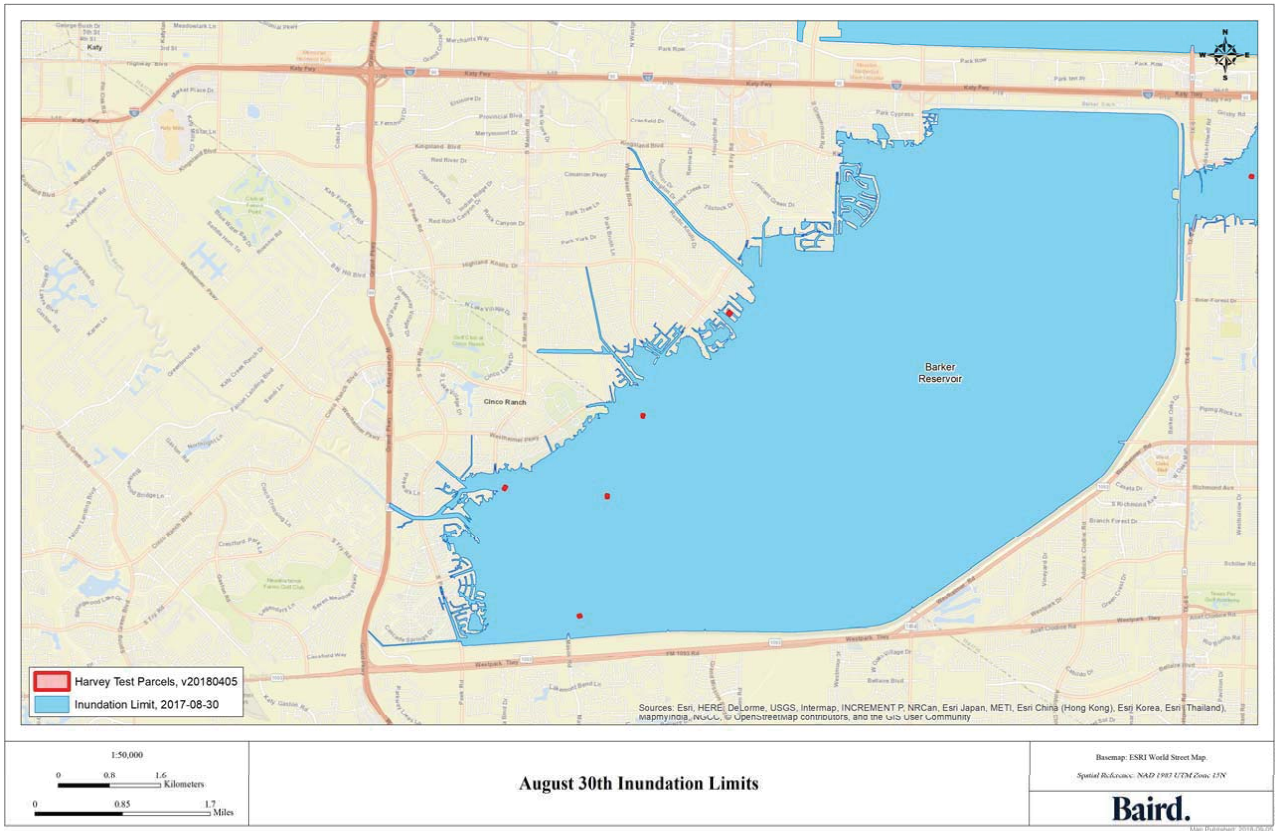


Figure 3.20: Tracked high water mark upstream of Barker reservoir based on NOAA mosaic aerial image dated 8/30/2018 (taken between 17:13 and 18:19)

Addicks and Barker Flood Control Reservoirs - Downstream Hydraulic Study
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3.7 Impact of Storm Water Drains

Storm water drains may influence flood characteristics (and particularly the timing of flooding) of houses in low-lying areas behind levees or any other type of barriers, where finished floor elevations are lower than free water surface elevations in the receiving streams at the outlet of the drains. Areas between these houses and the levees/barriers may be flooded due to reverse flow thorough storm water drains. In this case, storm water drainage network and ponded areas behind levees/barriers act as storage for water, as rising water levels would back up flows into the storm drainage network (when water surface elevation exceeds the elevation of the upstream end of the storm drain).

Downstream of the dams, this additional storage may not be significant as the network had already been surcharged due to excessive runoff from rainfall prior to the release from the reservoirs. Under this flow regime, low-lying areas are expected to be initially flooded generating flows through storm drains towards the receiving streams. During the Harvey Event, water surface elevations downstream of the dams rose rapidly in lower Buffalo Bayou and surrounding low-lying areas surcharging the storm drainage network. During the Harvey Event and within the Focus Area, there was no temporal or spatial lag between rainfall peaks and stage elevation peaks below of the dams. This indicates that the storm water drainage network was surcharged during the Harvey Event. Therefore, backwater flows through storm drains and storage of the storm drainage network can be neglected for the area downstream of the dams.

3.8 Groundwater Flow

The flow rate through soil (subsurface or seepage flow) is dependent on Darcy's permeability (or hydraulic conductivity) k [LT^{-1}] and the hydraulic gradient i [-], which is defined by Darcy's law as follows:

$$v = k \cdot i$$

The largest hydraulic gradient within the model domain is across the Addicks and Barker Dams around the gates section (i.e. the lowest point on the downstream side of the embankments). Water stored behind the dams during the Harvey Event could have created a maximum head difference of 28.2 ft and 21.8 ft²⁴ between the upstream and downstream sides of Addicks and Barker embankments, respectively. At these maximum head differences, hydraulic gradients as high as 1:6.2 and 1:11.3²⁵ could have been generated across the Addicks and Barker embankments, respectively. Assuming a very high hydraulic conductivity of $k = 7.3 \times 10^{-3}$ m/s, the maximum seepage flow rate across the dams is estimated to be 3.9e-3 fps, which could contribute to a maximum seepage flow rate of the order of 7 cfs²⁶. This potentially maximum subsurface flow rate is several orders of magnitude less than the rates of release from either Addicks or Barker Reservoirs and surface runoff rates from local rainfall, which are on the order of thousands of cfs. Therefore, groundwater flows can be neglected.

3.9 Release from the Reservoirs

During the Harvey Event, releases from Addicks and Barker Reservoirs were made in accordance with the induced surcharge regulations as described in Section 2.11.4. The discharge released from the reservoirs is a function of head and tailwater elevations and gate heights. During the Harvey Event, water surface elevations

²⁴ Based on maximum differences between gage heights upstream and downstream of the embankments [13].

²⁵ Assuming a linear hydraulic gradient across embankments (top of embankment width = 15 ft, side slopes = 1:3 [53, p. USACE020444], [54, p. USACE067106])

²⁶ Assuming flow area of 60 (width of Addicks outlet [53, p. USACE020445]) by 30 (water depth in Addicks outlet at maximum head difference between upstream and downstream [13] and [53, p. USACE020445]) ft².

downstream of Addicks and Barker Reservoirs rose above the downstream soffit elevations of the respective conduits, a condition called “tailwater submergence”. According to the Corps records, tailwater submergence has never been experienced before the Harvey Event. A tailwater submergence condition results in the development of a “submerged hydraulic jump” downstream of the conduits, provided that the gate heights force the development of supercritical flow downstream of the conduits. The submerged hydraulic jump includes a free hydraulic jump above the channel bed and a large eddy above the free jump. Under this condition, discharges through the conduits may be reduced²⁷, whereby the large eddy above the free jump gives rise to a reverse flow in the upper part of the water column. Exact estimates of flow through the channel during the Harvey Event (under tailwater submergence condition) would have required continuous direct measurements of discharges downstream of the dams as well as estimates of runoff contributions or any other source of discharge downstream of the dams (which should be deducted from the measurements) and estimates of lateral backwater flows to tributaries including flow over the channel banks (which should be added to the measurements).

During the Harvey Event, USGS completed a limited number of measurements downstream of Addicks Reservoir and downstream of Highway 6 (downstream of Barker Reservoir including flow contributions from Clodine and Barker Ditches). Runoff and other discharge contributions were not estimated along with these measurements. Therefore, USGS discrete discharge measurements can only represent approximate rates of release from Addicks and Barker Reservoirs.

The following data sources have been used to estimate approximate discharge released through the Addicks and Barker gates:

- Water surface elevations upstream and downstream of the conduits (based on USGS gages [13]);
- Gate height schedules ([19], [18]);
- Outlet rating curves from the 2012 Water Control Manual (WCM) ([7, p. USACE020314] and [7, p. USACE020315]) not accounting for tailwater submergence;
- Discharge equations developed by the Corps providing approximate rates of release without tailwater submergence ([19], [18]; details are provided in Appendix A); and
- Discharge equations developed by the Corps providing approximate rates of release including tailwater submergence (provided by the Corps [27], [28]; details are provided in Appendix A).

Figure 3.21 shows estimated releases from Addicks Reservoir using various sources. Estimated discharges using the outlet rating curve from the 2012 WCM ([7, p. USACE020314]) and discharge equations without tailwater submergence [19] are almost identical; however they don't account for tailwater submergence. Estimated releases using the discharge equations including tailwater submergence ([27] and [28]) are about 15% less than estimates without tailwater submergence. The USGS discharge measurements downstream of Addicks Reservoir in the upper part of Lower Langham Creek include additional discharge from local runoff. Therefore, USGS measurements downstream of Addicks Reservoirs are expected to be greater than the actual approximated rates of release from the reservoir. Approximate rates of release (grey line) have been derived based on the following criteria:

- A realistic intermediate line between estimated releases with and without tailwater submergence; and
- Releases resulting in modeled water surface elevations downstream of the dams in agreement with the measured gage data (refer to Section 4.5.5).

Figure 3.22 shows estimated releases from Barker Reservoir using various sources. Estimated discharges using discharge equations including tailwater submergence are about 25% lower than those estimated without tailwater submergence. Estimated discharges using the outlet rating curve from the 2012 WCM [7, p.

²⁷ Compared to the normal conditions without tailwater submergence.

USACE020315] are much closer to those estimated using the discharge equations without tailwater submergence. It is believed that the lower parts of Clodine and Barker Ditches were impacted by backwater from lower Buffalo Bayou during the Harvey Event, as demonstrated in Figure 3.23. Therefore, USGS discharge measurements in lower Buffalo Bayou downstream of the confluence with these ditches would have been smaller than the actual approximated releases. By chance, the original discharge equations without tailwater submergence [18] were found to best define the approximate rate of release from Barker Reservoir, as shown in Figure 3.22 (grey line)²⁸. Using this approach provided the best agreement between modeled and measured water surface elevations from gage data in lower Buffalo Bayou (refer to Section 4.5.5).

The first and second ramp ups of releases starting around 8/28/2017 1:00-2:00 and 8/29/2017 7:00-9:00 are evident, as shown in Figure 3.21 and Figure 3.22.

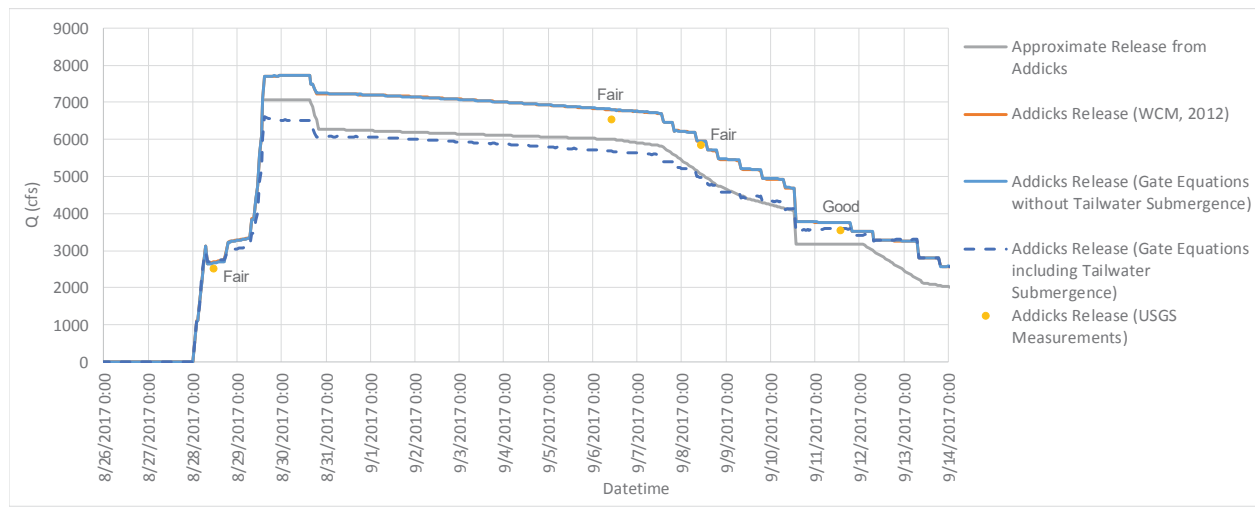


Figure 3.21: Estimated Addicks Release using various sources. The adopted best estimate of discharge for model input to lower Buffalo Bayou is the grey line. The Addicks release based on gate equations without tailwater submergence (solid blue line) is almost identical to the Addicks release rating curves from the 2012 WCM (orange line). The dashed blue line is the estimate of release based on gate equations considering tailwater submergence. USGS measurements of discharge are shown as yellow dots (together with a good-fair-poor rating on accuracy of the measurement).

²⁸ It would appear that for these very high flow releases the without tailwater gate equations must under-estimate the actual releases (this condition has never actually occurred in the history of the gate operation).

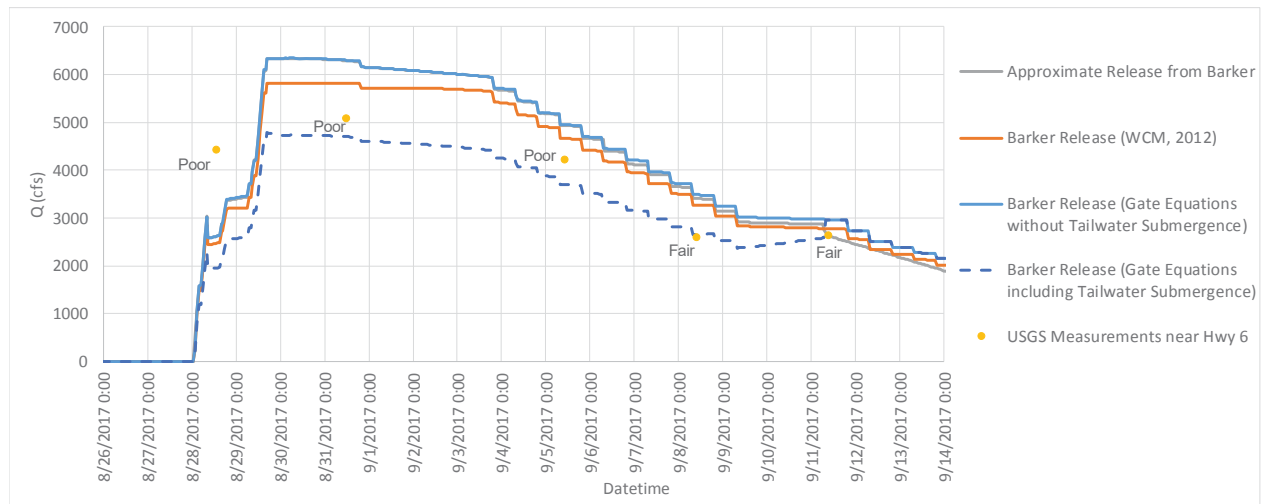


Figure 3.22: Estimated Barker Release using various sources. The adopted best estimate of discharge for model input to lower Buffalo Bayou is the grey line which mostly lies (by chance) under the solid blue line representing the release estimates derived from gate equations without tailwater submergence. The dashed blue line is the estimate of release based on gate equations considering tailwater submergence. USGS measurements of discharge are shown as yellow dots (together with a good-fair-poor rating on accuracy of the measurement).

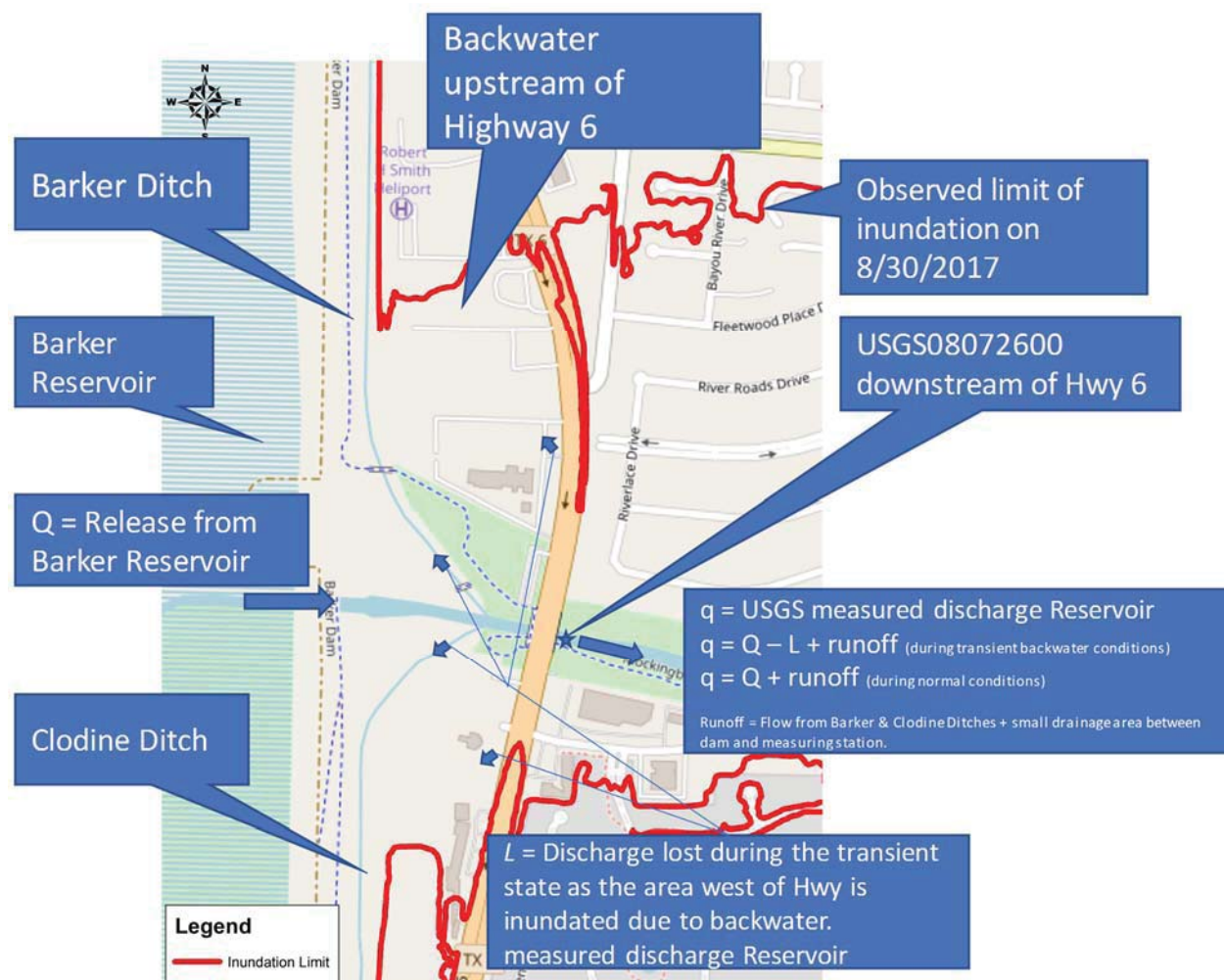


Figure 3.23: Schematic diagram showing inflows to and outflows from a control volume between Barker conduits and Highway 6. The transient backwater storage depicted in this figure explains why the measured discharges by USGS would have under-estimated the actual releases from the Barker conduits.

3.10 Characteristics of Flooding (based on physical data)

Addicks and Barker Reservoirs stored at least 127 Billion US Gallons of floodwater during the Harvey Event, which exceeded the SPF causing inundation due to backwater upstream of the reservoirs.

Storm water drains may influence the timing of flooding upstream of the dams as they may convey floodwater backward from the receiving streams towards developed areas due to rising water surface elevations in these streams (above the elevation of the upstream ends of storm drains). This backwater flow may cause ponding in low-lying areas (and additional storage) upstream of the dams as pool elevations rise rapidly.

Numerical modeling of inundation under various scenarios is required to better understand the characteristics of flooding within the Focus Area. The following sections describe the model development, calibration, validation and application.

4. Inundation Modeling

4.1 Modeling Objective

The overarching objective of the numerical modeling of inundation presented in this report was to develop a model capable of simulating inundation depth and timing with a reasonable accuracy during extreme historical and hypothetical rainfall/storm events within the Focus Area, and particularly at the Test Property locations. The model provides a tool to study the characteristics of flooding within the Focus Area by filling the gaps between available gage data and by simulating flooding under various dam operation assumptions. Further, the model provides a tool to study impacts of the federal project by simulating flooding under various physical configurations.

In order to achieve this objective, a two-dimensional distributed model capable of simulating runoff, inundation and storm surge for extreme rainfall/storm events (including Hurricane Harvey) was identified and applied.

4.2 Model Selection

Some key characteristics of the watershed that influence model selection are described in this paragraph. Under major floods, many of the drainage basins within Harris County are characterized by basin overflow [6, p. FEMA000249]. The Addicks and Barker watersheds are connected to the lower Buffalo Bayou watershed through the Addicks and Barker Reservoir gates. Hurricane Harvey rainfall featured significant temporal and spatial variation over the Buffalo Bayou watershed. Also, given the extreme amount of rainfall, overland sheet flow was the dominant mode of flow. Therefore, to simulate major flood events, a two-dimensional distributed model must be employed. In addition, the model should be capable of handling large domains to represent all of the watersheds of concern. The model domain should include watersheds within Harris County and Fort Bend County, the Cypress Creek watershed, and other contributing watersheds (the Domain), and should simulate the conveyance across these watersheds (including the releases from Addicks and Barker Reservoirs).

During major flood events, soils become saturated during the early stages of the storm and storm drains become fully surcharged²⁹. As such, major floods can be simulated using a free surface flow model, where sub-surface flows can be ignored within the model.

Free surface flows are governed by the Navier-Stokes equations. Depth averaging (integration over the flow depth) of the Navier-Stokes equations results in the non-linear shallow water equations (NLSW), which govern the two-dimensional flow. During major floods in the domain, runoff discharges and release from Addicks and Barker Dams could lead to relatively high flow velocities. In addition, operation of the dam gates typically leads to flood waves due to the relatively rapid opening of the control gates. Therefore, a two-dimensional model based on the NLSW equations should be applied in order to simulate such flood waves.

Other spatially-confined rapidly varied flows such as hydraulic jumps that may develop below the control gates or rapid drops downstream of weirs or other obstructions are localized flow features of negligible importance considering the scale of the study and the locations of the Test Properties. These spatially-confined rapidly varied flows require extensive computational requirements to resolve, while they may only have minimal impact on inundation of the floodplain.

²⁹ Storm sewers are typically designed based on a 2-year return period.

During the Harvey Event, rainfall intensities across the various watersheds of interest were significantly variable both temporally and spatially. As such, the selected 2D numerical model must support temporal and spatial rainfall variability.

In summary, in order to achieve the modeling objective, the numerical model must include the following main features:

- Surface water model.
- Two-dimensional distributed (vs. lumped hydrologic) model.
- Governing equations based on depth-averaged Navier-Stokes equations (or non-linear shallow water equations, NLSW)
- Capable of handling large domains.
- Capable of including temporal and spatial rainfall variability.

Table 4.1 presents a comparison between model features of four different numerical models for free surface water flow, namely: GSSHA (model I), HEC-RAS (model II), MIKE FLOOD (model III) and TELEMAC (model IV). Due to its stability and efficient computational solver, the TELEMAC model was assessed to be capable of simulating a relatively large domain and was selected for this study. TELEMAC is an open source model widely used to simulate free surface flows in large domains.

Table 4.1: Comparison between free surface water models considered

Model Features	Models Considered				Superiority
	GSSHA (I)	HEC-RAS (II)	MIKE FLOOD (III)	TELEMAC (IV)	
Governing Equations	DWA**	DWA** or NLSW*	NLSW*	NLSW*	II, III, IV
Discretization	Finite Volume	Finite Volume	Finite Volume	Finite Element or Finite Volume	N/A
Parallelized	Yes	Yes	Yes	Yes	N/A
Solver	Explicit	Explicit	Explicit	Implicit or Explicit	IV***
Grid	Cartesian	Flexible	Flexible	Flexible	II, III, IV
Stability	Conditional	Conditional	Conditional	Unconditional****	IV
Wetting/drying	Yes	Yes	Yes	Yes	N/A
Storm surge	Yes	No	Yes	Yes	I, III, IV
Rainfall Variability	Time & Space	Time only	Time & Space	Time & Space*****	II, III, IV
Auto Calibration	Available	Not available	Not Available	Not available	I

*NLSW: Non-linear shallow water equations are derived from depth-integration of the Navier–Stokes equations.

** DWA: Diffusive Wave Approx. of NLSW eqns. is derived by ignoring advective acceleration terms. Approximation does not hold for high Froude number flows such as wetting and drying during flooding and drying out.

*** Implicit solvers are preferred because they are much quicker than explicit solvers. This is needed for this study.

**** TELEMAC implicit solver is “theoretically” unconditionally stable whereby Courant Number >1 can be used.

***** Required development of spatial variability subroutine.

4.3 TELEMAC 2D Model

TELEMAC 2D was initially developed by the National Hydraulics and Environment Laboratory (Laboratoire National d’Hydraulique et Environnement - LNHE) of the Research and Development Directorate of the French Electricity Board (EDF-R&D), and is now managed by a consortium of other consultants and research institutes (more information can be found in www.opentelemac.org) [29]. Like previous versions of the program, version 7.0 complies with EDF-R&D’s Quality Assurance procedures for scientific and technical programs.

The following sections provide a description of the TELEMAC 2D model.

4.3.1 Governing Equations

4.3.1.1 Surface Water Flow

The non-linear shallow water (NLSW) equations which are also often referred to as the de Saint Venant equations govern surface flow. The NLSW equations are derived from the Navier Stokes equations under the assumption that the flow is irrotational and that the vertical acceleration is of negligible importance [30]. This equation set is valid for shallow water or long waves (the type of waves observed in rivers and due to rainfall flooding and storm surge fall into the long wave category). In vector form, with the water depth denoted by h and the depth-averaged water velocity denoted by $u = [u, v]^T$, the NLSW equations are as follows:

$$\frac{\partial h}{\partial t} + u \cdot \nabla h + h \nabla \cdot u = S_h$$

$$\frac{\partial u}{\partial t} + u \cdot \nabla u + h \nabla \cdot u = S_m$$

where S_h and S_m denote the vectors of source terms in the continuity and momentum equations, respectively. These source terms include the effects of bottom geometry, Coriolis force, bottom friction, rainfall and infiltration. Integration of the NLSW with respect to time yields the instantaneous values of water depth (and thus free surface) and depth-averaged velocity components. Integration of the equations at discrete time intervals, therefore, provides full detail of the time-evolution of the flow within the constraints of the shallow water framework.

4.3.1.2 Infiltration (Loss)

The Soil Conservation Services (SCS) Curve Number provides an empirical method to determine runoff generated by precipitation [31]. The Curve Number method uses soil type, land use, and antecedent moisture conditions to generate a single curve number ranging from 0 to 100. Higher values of curve numbers indicate areas that have higher potential for runoff in a rainfall event. The curve number is first used to determine the potential maximum soil moisture retained after runoff begins (S).

$$S = \left(\frac{1000}{CN} - 10 \right)$$

The potential maximum soil moisture is used to determine the initial abstraction (I_a), which is the amount of precipitation (P) that is intercepted (by infiltration into the soil) before runoff occurs. If precipitation depth is less than the initial abstraction, no runoff occurs.

$$I_a = 0.2 \times S$$

The initial abstraction is then incorporated into a runoff equation to determine the total runoff (Q). Both initial abstraction and runoff are provided in units of inches of runoff.

$$Q = \frac{(P - I_a)^2}{P - I_a + S}$$

4.3.2 Numerical Solution

The open source TELEMAC 2D software includes both finite element (FE) and finite volume (FVM) solution techniques for the NLSW equations. The FE-type solution has been chosen for this study since it has been implemented in a fully implicit form. Even with distributed memory parallelization, run times for explicit schemes can still be prohibitive for large domains (>1M computational nodes) because the time step

restrictions for explicit schemes are governed by the CFL³⁰ condition [32] and are, therefore, relatively stringent. The advantage of using a fully implicit solver, like the FE solution technique used in TELEMAC 2D, is the ability to employ a Courant number (Courant et al., 1967 [32]) greater than unity, and thus use a larger time-step, resulting in computationally efficient simulations..

4.3.3 Boundary Conditions

4.3.3.1 Transmissive Boundary Conditions

At open boundaries, a pseudo-Sommerfeld radiation type condition is employed. In this approach, the shallow water wave celerity c is calculated from the nearest computed water depth d at the boundary node ($c = \sqrt{g \cdot d}$). The celerity is then multiplied by the x - and y -component of the unit outward normal at the boundary edge in order to obtain the u - and v -velocity components, respectively. In order to further suppress numerical instabilities at the boundary, the values of these velocity components were limited. This approach works well as a far-field boundary condition if the boundary is far enough from the area of interest.

4.3.3.2 Galveston Bay Tidal Boundary

Tidal boundary conditions (including storm surge) driven by water levels extracted from NOAA Gage 8770613 [33] have been adopted for the Galveston Bay offshore boundary. For tidal type boundary conditions, tides are prescribed as free surface time-series as opposed to using TPXO data³¹. The standard TELEMAC model approach for prescribing a Dirichlet condition on the water depth (read in from a time-series file based on measured WSE at NOAA gage) and free velocities (as described in Section 4.3.3.1) is adopted. Under this approach, the continuity equation is not solved since the prescribed value of the depth is forced at the boundary node, which can lead to violation of mass conservation. Therefore, the TELEMAC option to include “continuity correction” was employed to resolve this issue. This type of boundary treatment was selected due to its suitability as a far-field boundary (far enough from the area of interest).

4.3.4 Model Development

4.3.4.1 Spatially Varied Rainfall and Wind Fields

The implementation of spatially varying rainfall involves the modification of a number of TELEMAC subroutines (refer to [29]). The “TELEMAC METEO_FROM_BINARY_FILE” and the “READ_BIN_2D” subroutines were modified to enable reading of rainfall intensities over the computational grid. A few modifications to the subroutine “RUNOFF_SCS_CN” were made to enable the rainfall data to be time and space varying.

The ability to read in a time and space varying wind field is achieved in a similar fashion.

4.3.4.2 Flow through Addicks and Barker Conduits

Flow through the Addicks and Barker conduits were treated in the model as mass sources and sinks. The values of these mass sources and sinks are defined based on the outlet rating curves ([7, p. USACE020314] and [7, p. USACE020315]) accounting for discharge reduction due to tailwater submergence as discussed in Section 3.9. The model was modified to include the definition of sources and sinks either to represent total released discharges as defined by grey lines in Figure 3.21 and Figure 3.22.

³⁰ The “CFL” condition is named after R. Courant, K. Friedrichs, and H. Lewy who first described it in their 1928 paper, which was later translated and published in 1967 [32].

³¹ “TPXO is a series of fully-global models of ocean tides, which best-fits, in a least-squares sense, the Laplace Tidal Equations and altimetry data.” [59]

4.3.5 Model Limitations

TELEMAC 2D is a surface water model that uses a computational mesh to discretize the model domain. The following outlines the model limitations as they apply to the Focus Area.

4.3.5.1 Model Type

The free surface flow model does not include sub-surface flows. Therefore, subsurface flows (such as seepage flow) cannot be simulated by the model. As demonstrated in Section 3.8, groundwater flows are found to be relatively insignificant.

4.3.5.2 Limited Number of Culverts

While culvert structures can be included in surface water models through the introduction of flow as a function of free surface elevations at both ends of each culvert structure, such treatment of culvert structures may introduce model instability and should be limited.

Typically, under normal flow conditions, a culvert conveys water across a street as a free surface flow (if water surface elevations are lower than the culvert's soffit) or as a pressurized flow (driven by head difference on either side of the street). Culverts can range from small storm water drains (order of 1-2 ft diameter) to large culverts on major streams (i.e. concrete box culverts). The flow through a culvert becomes ineffective after flooding of the street with insignificant head difference across the street. Excessive runoff flooded streets within the Focus Area during the Harvey Event within a relatively short period of time. Therefore, we determined that most of the culverts in the model domain can be omitted, except those culverts conveying water across major roads that were not flooded during the Harvey Event.

Under this type of treatment, the model is not capable of simulating drainage of low-lying areas (such as detention ponds). Simulated water surface elevations in these areas are expected to be generally higher since the model does not include any release mechanism of ponded floodwater. This may result in conservative estimates of peak water surface elevations (higher than actual) and duration of flooding (longer than actual) at Plaintiffs' homes located in low-lying areas, where floodwater could be trapped. This does not apply to Addicks and Barker Reservoirs, since their releases through the conduits are included in the model.

The model is also not capable of simulating flows through storm drains towards low-lying areas surrounded by higher ground elevations (such as banks or levees) in cases where water surface elevations in the adjacent waterbodies are higher than water surface elevations (or invert elevations of storm drains) at these low-lying areas. This condition may result in initial underestimates of peak water surface elevations at these low-lying areas prior to overtopping of the surrounding banks or levees. Ms. Burnham's Test Property is located in a low-lying area surrounded by higher ground elevations. This Test Property is located upstream of Addicks Reservoir to the south of the Langham Creek. The model is not capable of estimating early stages of flooding in this area due to the rising pool elevation in Addicks Reservoir and/or Langham Creek.

4.3.5.3 Model Topography

As discussed in Section 2.3, the model topography is based on the most recent LiDAR survey covering the entire model domain, which is dated 2008. Physical features that may have changed between 2008 and 2017 may impact model results. In addition, topography of low-lying areas and streams may not be well represented by the LiDAR survey if they were ponded at the time the LiDAR was flown³². This may lead to underestimates of the volume of detention ponds or underestimated capacities of the Addicks and/or Barker Reservoirs.

³² LiDAR does not penetrate below the water surface. Therefore, channel bathymetries must be provided by another survey source. Unlike streams downstream of the reservoirs, elevations derived from HEC-RAS cross sections upstream of the reservoirs are found very similar to the 2008 LiDAR.

Under-estimated reservoir and detention pond capacities upstream of the dams will generally lead to over-estimated water surface elevations at the upstream properties. Misrepresentation of the topography is not expected to impact model results below the dams, since the areas around lower Buffalo Bayou were fully urbanized by 2008 (precluding any significant topographic changes).

The LiDAR survey included in the model represents the bare-earth topography. As such, basements (where the First Floor Elevation is lower than the ground elevation) are not represented by the model. Therefore, flooding and drainage of basements through local drains are not captured by the model. In cases where Finished Floor Elevations at Plaintiffs' homes are lower than ground elevations, early flooding that may take place before flooding of the adjacent ground will not be simulated by the model. In reality, this early flooding could only occur through local drains or seepage flow providing subsurface entry for water to basements, which is less significant than flooding due to surface flow and is not captured by the model anyway (refer to Section 4.3.5.2).

The bare-earth topography does not include superstructures (such as buildings above grade and bridges). These superstructures may account for flow constrictions, which cannot be captured by the model. This may be significant in highly developed areas near flow paths. However, enhanced roughness of the floodplain was calibrated to account for additional roughness due to superstructures (as demonstrated by Beretta et al. [26]).

4.3.5.4 Computational Mesh

The model computational mesh reasonably represents streets and streams within the Focus Area (refer to Section 4.4.2). Outside the Focus Area, important physical features could be missed. These features may include detention ponds or other low-lying areas above Addicks and Barker Reservoirs, which may act as additional storage areas above Addicks and Barker. Misrepresentation of such low-lying areas may lead to over-estimated water surface elevations in the reservoirs and at the upstream properties.

4.3.5.5 Rapidly-Variied Flows

Spatially-confined rapidly varied flows (such as hydraulic jumps and rapid drops in water surface elevations) are not simulated due to escalating computational cost. These types of rapidly varied flows are insignificant compared to the scale of the study.

A minimum mesh element size must be reasonably selected to represent physical features such as street networks and channel cross sections. Such minimum element size, of the order of 10 – 15 ft, is not sufficiently small to resolve rapidly varied flow generating sudden water surface elevation changes (such as hydraulic jumps or elevation drops due to weirs or channel obstructions). Unlike the flood waves originated by the gate control, these types of "spatially-contained" rapidly varied flows may have minimal impact on inundation depths outside main channels and there are no Test Plaintiffs located in these areas anyway. In order to simulate such insignificant rapidly varied flows, element sizes must be reduced to less than a foot, which significantly increases the computational cost.

4.4 TELEMAC 2D Model Setup

4.4.1 Model Domain

The model domain covers an area of 1,173,751 acres including sub-basins within the Focus Area and other sub-basins that may overflow to impact the Focus Area (such as the Cypress Creek sub-basins). The model domain extends into Galveston Bay to account for storm surges and to act as an open boundary. The model domain is shown in Figure 4.3 along with HUC-8 watershed boundaries.

4.4.2 Mesh Generation

The model flexible mesh was generated to meet the following requirements:

- Mesh lines representing streets within the Focus Area in order to simulate sheet flow in streets during flood conditions
- Mesh lines representing channel beds and banks, gullies and tributaries within the Focus Area in order to correctly route flows through channels and low-lying areas
- Mesh lines representing dikes, bumps and other distinctive topographic features in order to simulate flow or water storage behind these features
- Mesh nodes at both ends of major hydraulic structures for treatment of flow boundaries
- Mesh nodes with sufficient resolution to represent flooded subdivisions, including Test Plaintiffs' homes

The finite element mesh for the TELEMAC-2D model was generated using Blue Kenue™ software, developed by National Research Council Canada [34] and R [35]. Channels were represented by elements elongated in the direction of flow, with at least 3 elements across the channel. Elements were forced to represent topographic features within the floodplain (such as a bike trail). The total number of mesh nodes representing the physical conditions prior to the Harvey Event is 1,447,889 forming 2,902,890 triangular elements. Other computational meshes were generated using similar resolution and approach to represent conditions for other model runs.

4.4.3 Physical Parameters

4.4.3.1 Rainfall

As noted earlier in Section 2.9, we acquired rainfall data for the Harvey Event across the model domain from the Harris County Flood Warning System website [14]. In addition, we utilized the outcome of the Storm Precipitation Analysis System describing rainfall as 60-minute rainfall data gridded at a spatial resolution of 0.01 seconds of latitude/longitude (approximately 1 km² resolution) [15]. Figure 4.1 shows the total accumulated rainfall depths during the Harvey Event across the model domain.

4.4.3.2 Model Topography

As noted in Sections 2.3 and 2.4, various sources have been used to develop the model topography, which are summarized as follows:

- 2008 LiDAR [9, pp. BAIRD0000294-345] was used to represent the topography of the entire model domain;
- NOAA Galveston Coastal DEM was used to represent the bathymetry of Galveston Bay [36];
- 2014 LiDAR [10] was used to update the topography in areas of Fort Bend County (including tributaries draining to Barker Reservoir);
- HEC-RAS cross sections [11] were used to update channels sections as applicable; and
- 2018 LiDAR [12] was used to update the Lower Langham Creek cross section (at the Addicks outlet).

Figure 4.2 presents the various sources used to develop TELEMAC-2D model topography.

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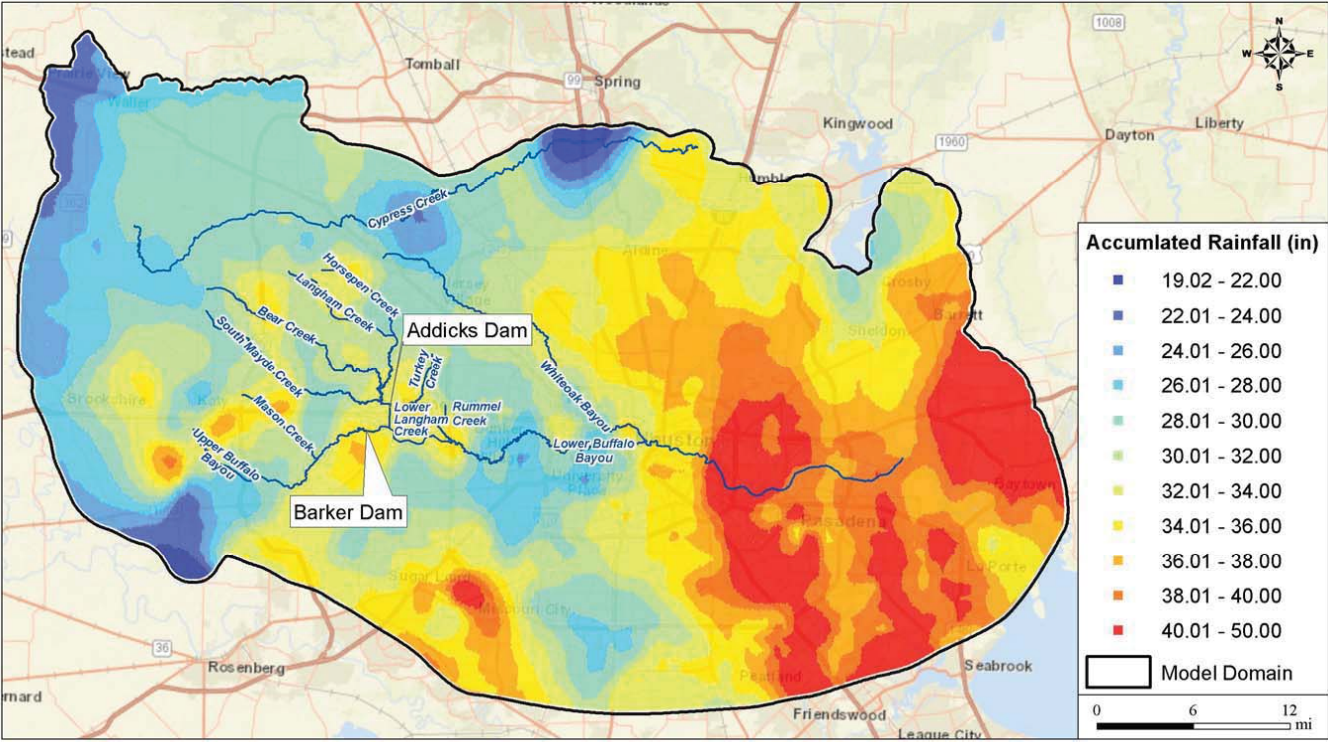


Figure 4.1: Total accumulated rainfall depth during the Harvey Event across the model domain.

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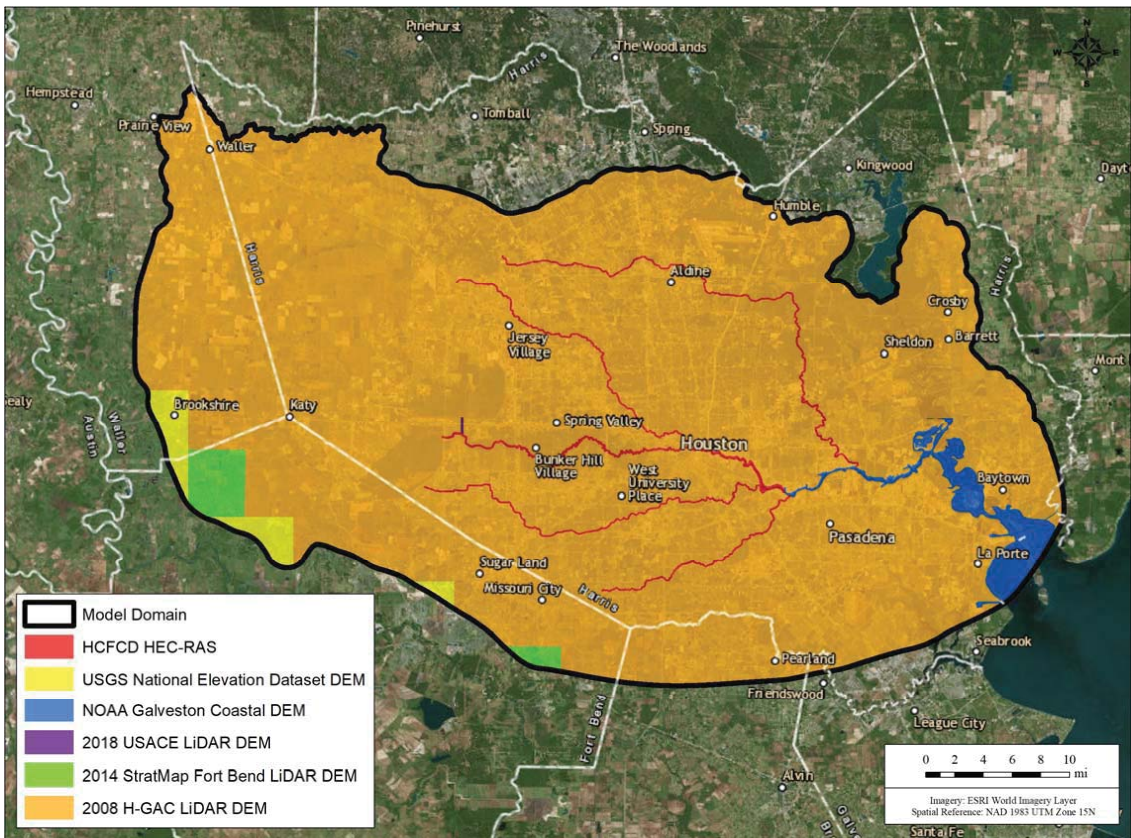


Figure 4.2: Sources of model topography.

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4.4.3.3 Hydrologic Losses

As noted earlier, hydrologic losses (due to infiltration, interception and other factors) were estimated using the Curve Number method. Datasets include the eight-digit hydrologic unit code (HUC-8) watersheds from USDA–NRCS, land use data from the 2011 National Land Cover Database (NLCD 2011 [37]) from a collaboration of governmental agencies, and the SSURGO hydrologic soil group from USDA–NRCS. Datasets were downloaded using the National Geospatial Data Gateway available from the United States Department of Agriculture National Resource Conservation Service (USDA–NRCS) [38].

Once data were downloaded and consolidated, they were incorporated into GIS software. The HUC-8 watersheds within the model domain are shown in Figure 4.3. Land cover data within the HUC-8 watersheds overlapping the model domain were summarized into various classifications with each classification representing a unique land use category, as shown in Figure 4.4. The relevant soil data within the HUC-8 watersheds were summarized into four hydrologic soil groups (HSGs), which are shown in Figure 4.5 [39]. The HSGs are classified from A to D, with A indicating soils with high permeability and D indicating soils with low permeability.

To calculate curve numbers, the land use categories and the hydrologic soils groups were consolidated across the model domain to calculate the curve number for each combination of values. Table 4.2 shows the curve number for the different land uses and soil groups. In addition to land use type and soil type, curve number also depends on the moisture content of the soil before the storm event. Antecedent soil moisture condition (AMC)³³ represents the amount of water in the soil. AMC is categorized into three conditions: AMC I, AMC II, and AMC III. Curve numbers provided in Table 4.2 are representative of AMC II. AMC, although informed by available information on soil moisture, ultimately becomes a model calibration parameter within the range of reasonable values. We address this further in Section 4.5.

To simulate losses during other historical events, historical land use mapping is required. The NLCD is not available before 1992³⁴. Therefore, representation of lumped land use categories has been completed by Halfff based on analysis of historical imagery [40]. Table 4.3, Table 4.4 and Table 4.5 provide Curve Number values corresponding to historical lumped land use categories (provided by [40]) for various AMC conditions and hydrologic soil groups. Curve number maps representing existing conditions were prepared by intersecting the following three GIS layers within the model domain:

- Hydrologic Soil Group (Figure 4.5);
- Antecedent Moisture Conditions map, in accordance with the calibrated model assuming AMC representative of conditions prior to the Harvey Event; and
- Land use map provided by NLCD [41] where applicable or, otherwise, as defined by [40].

³³ Also defined by [60, pp. 10–5] as Antecedent Runoff Condition (ARC), which collectively accounts for the variability in runoff predictions due to factors including rainfall intensity and duration, total rainfall, soil moisture conditions, cover density, stage of growth, and temperature.

³⁴ Years available: 1992, 2001, 2006 and 2011. Year 2016 is currently being produced.

Table 4.2: Curve number (AMC II) by land use and soil type

	Hydrologic Soil Group			
Cover Type	A	B	C	D
Water	100	100	100	100
Open Space (Good)	39	61	74	80
Residential - 1/2 acre	54	70	80	85
Residential - 1/8 acre	77	85	90	92
Commercial & Business	89	92	94	95
Fallow - Bare Soil	77	86	91	94
Oak-Aspen (Good)	30	30	41	48
Woods (Good)	30	55	70	77
Woods (Fair)	36	60	73	79
Brush (Fair)	35	56	70	77
Pasture, Grassland (Fair)	49	69	79	84
Meadow	30	58	71	78
Row Crops - SR (Good)	67	78	85	89
Woody Wetlands	100	100	100	100
Emergent Herbaceous Wetlands	100	100	100	100

Table 4.3: Curve Numbers for historic land use classes, AMC I

Class	NLCD ID#	% Impervious	HSG			
			A	B	C	D
Developed green areas	21	15	21	40	54	63
High density	24	85	77	83	87	89
Isolated transportation	N/A	90	95	95	95	95
Light industrial/commercial	22	60	33	49	63	70
Residential large lot – older	22	20 and 0	33	49	63	70
Residential rural lot	21	5 and 0	21	40	54	63
Residential small lot	22	40 and 0	33	49	63	70
Schools	22	40	33	49	63	70
Undeveloped	71	0	29	48	61	69
Water	11	100	100	100	100	100

Table 4.4: Curve Numbers for historic land use classes, AMC II

Class	NLCD ID#	% Impervious	HSG			
			A	B	C	D
Developed green areas	21	15	39	61	74	80
High density	24	85	89	92	94	95
Isolated transportation	N/A	90	98	98	98	98
Light industrial/commercial	22	60	54	70	80	85
Residential large lot – older	22	20 and 0	54	70	80	85
Residential rural lot	21	5 and 0	39	61	74	80
Residential small lot	22	40 and 0	54	70	80	85
Schools	22	40	54	70	80	85
Undeveloped	71	0	49	69	79	84
Water	11	100	100	100	100	100

Table 4.5: Curve Numbers for historic land use classes, AMC III

Class	NLCD ID#	% Impervious	HSG			
			A	B	C	D
Developed green areas	21	15	60	78	87	90
High density	24	85	95	96	97	98
Isolated transportation	N/A	90	99	99	99	99
Light industrial/commercial	22	60	73	84	90	93
Residential large lot – older	22	20 and 0	73	84	90	93
Residential rural lot	21	5 and 0	60	78	87	90
Residential small lot	22	40 and 0	73	84	90	93
Schools	22	40	73	84	90	93
Undeveloped	71	0	69	84	90	92
Water	11	100	100	100	100	100

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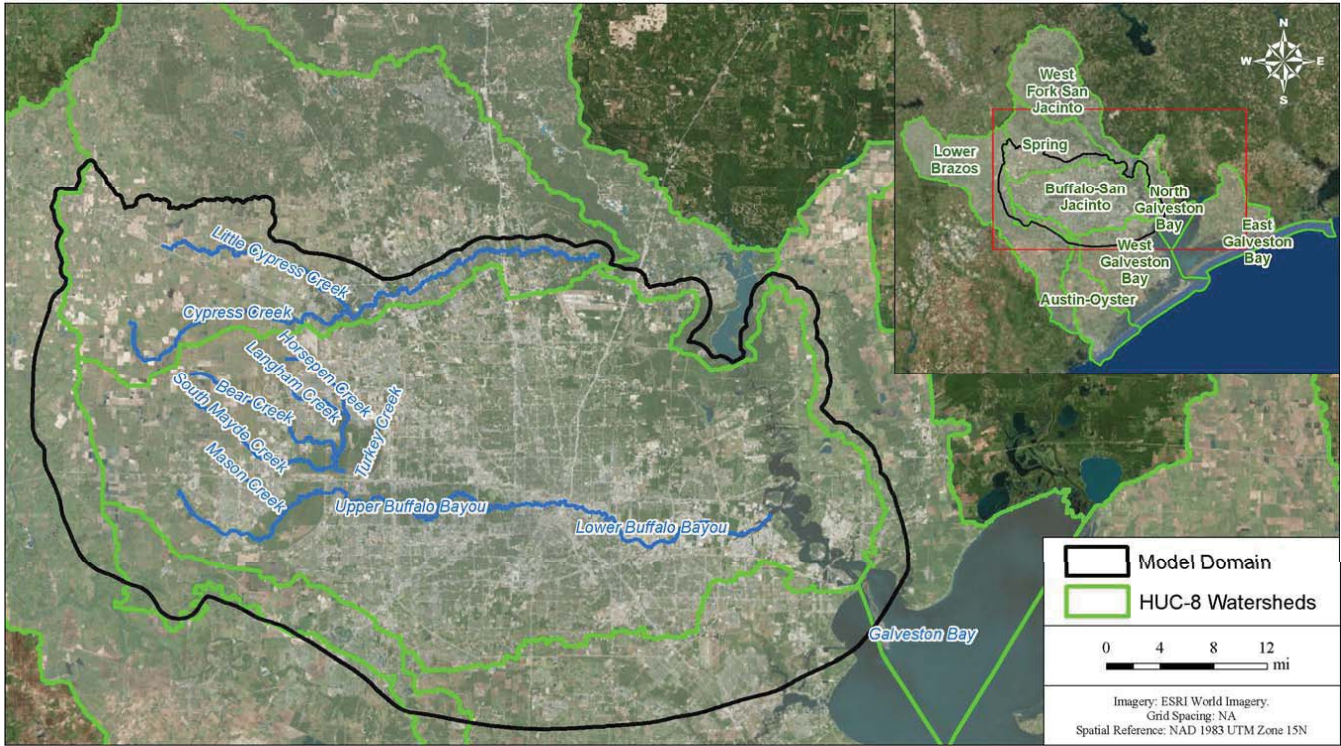


Figure 4.3: HUC-8 watersheds within the model domain

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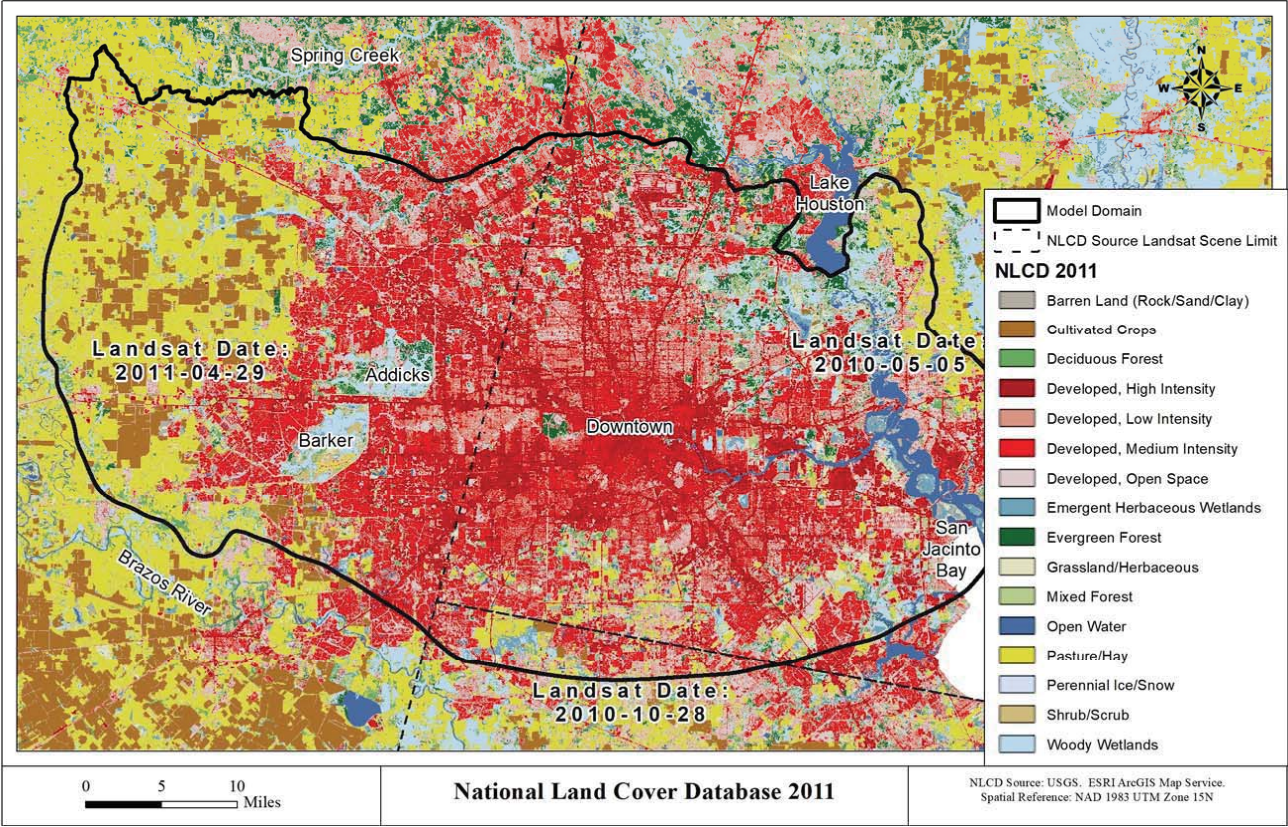


Figure 4.4: NLCD land use classifications within the model domain.

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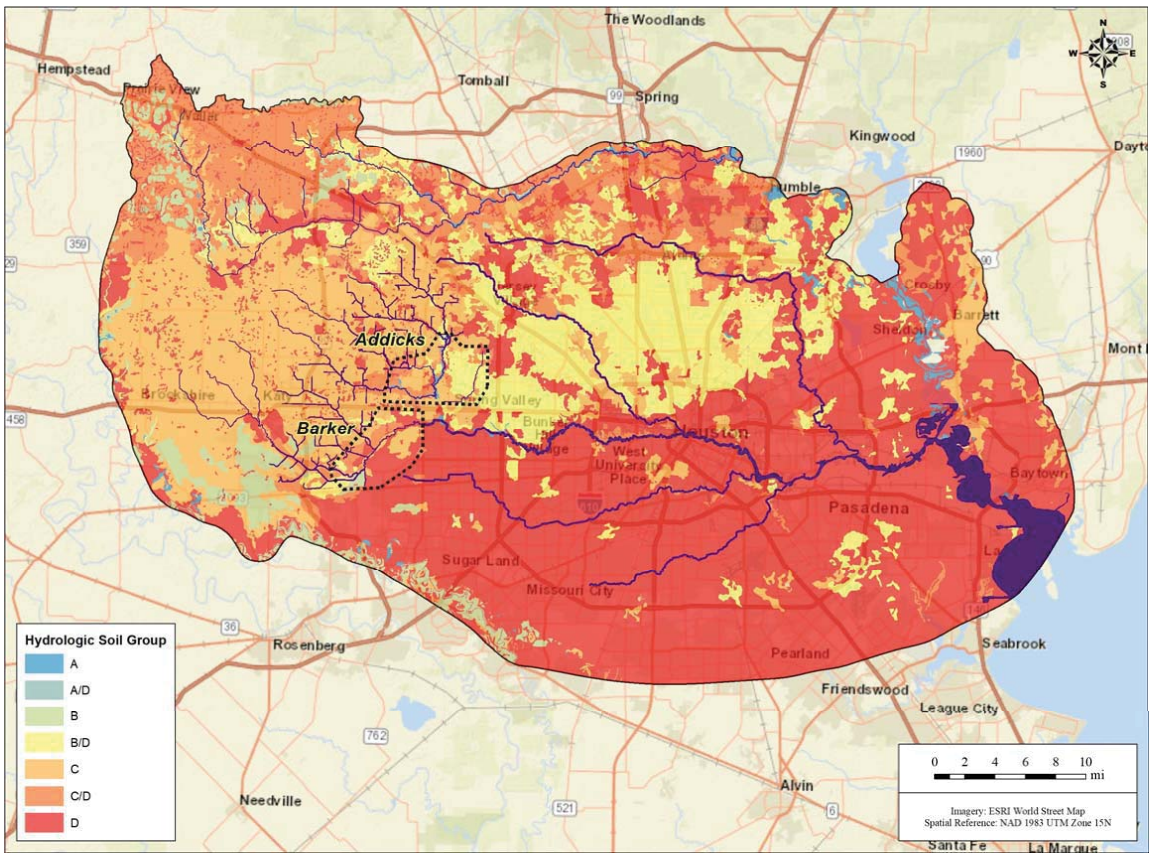


Figure 4.5: Hydrologic soil groups within the model domain (downloaded from [39])

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4.4.3.4 Manning's Roughness

Manning's n ranges derived in Section 3.4 are summarized in Table 4.6 for the main streams within the Focus Area. For the remainder of the watershed, the National Landcover Database 2011 (NLCD 2011, [37]) was used to define land classes for the model domain. National Land Cover Database 2011 (NLCD 2011) is the most recent national land cover product created by the Multi-Resolution Land Characteristics (MRLC) Consortium [37].

Manning's roughness formulation is used to parameterize the over ground sheet flow using spatially varied Manning's n roughness coefficients. Manning's roughness coefficients are assigned to mesh nodes based on land cover classes as proposed by [42] and presented in Table 4.7.

In order to represent historic conditions, where NLCD is not available, lumped land use categories defined by [40] were used to define Manning's n as summarized in Table 4.8.

Table 4.6: Manning's n derived ranges for main streams within the Focus Area.

Stream Name	Manning's n derived values ($m^{-1/3}.s$)	
	Channel	Floodplain
Lower Buffalo Bayou	0.03 – 0.08	0.1 – 0.28
Upper tributaries	0.015 – 0.06	0.1 – 0.2

Table 4.7: Manning's n assigned values for various NLCD land cover classes within the model domain.

NLCD Class No.	NLCD Class Name	Manning's n ($m^{-1/3}.s$) [42]
21	Developed open space	0.020
22	Developed low intensity	0.050
23	Developed medium intensity	0.100
24	Developed high intensity	0.130
31	Barren land (rock/sand/clay)	0.090
32	Unconsolidated shore	0.040
41	Deciduous forest	0.100
42	Evergreen forest	0.110
43	Mixed forest	0.100
51	Dwarf scrub	0.040
52	Shrub/scrub	0.050
71	Grassland/herbaceous	0.034
72	Sedge/herbaceous	0.030

73	Lichens	0.027
74	Moss	0.025
81	Pasture/hay	0.033
82	Cultivated crops	0.037
90	Woody wetlands	0.140
91	Palustrine forested wetland	0.100
92	Palustrine scrub/shrub wetland	0.048
93	Estuarine forested wetland	0.100
94	Estuarine scrub/Shrub wetland	0.048
95	Emergent herbaceous wetlands	0.045
96	Palustrine emergent wetland (persistent)	0.045
97	Estuarine emergent wetland	0.045
98	Palustrine aquatic bed	0.015
99	Estuarine aquatic bed	0.015

Table 4.8: Manning's n values for historic land use classes

Class	Percent Impervious	Manning's n (Selected value)
Developed green areas	15	0.020 [42] - 0.040 [43] (0.03)
High density	85	0.130 [42]
Isolated transportation	90	0.0112 [31]
Light industrial/commercial	60	0.080 [43]
Residential large lot – older	20 and 0	0.04 [43] - 0.10 [43] (0.10)
Residential rural lot	5 and 0	0.040 [43]
Residential small lot	40 and 0	0.100 [43]
Schools	40	0.100 [43]
Undeveloped	0	0.033 [42]
Water	100	0.020 [42]

4.4.3.5 Hydraulic Structures

The model domain includes Addicks and Barker dams, which are represented in the model as topographic features, where mesh elements are refined enough to represent the embankments. Similarly, auxiliary spillways at both ends of each dam are represented as topographic features. Flow through gated conduits is estimated as a function of the gate height and head water elevation (refer to Section 3.9).

Other hydraulic structures within the Focus Area include culverts and other smaller stormwater drains. As discussed in Section 4.3.5.2, only major culverts conveying water across major roads that were not overtopped during the Harvey Event have been included in the model. Major culverts included in the model are shown in Figure 4.6.

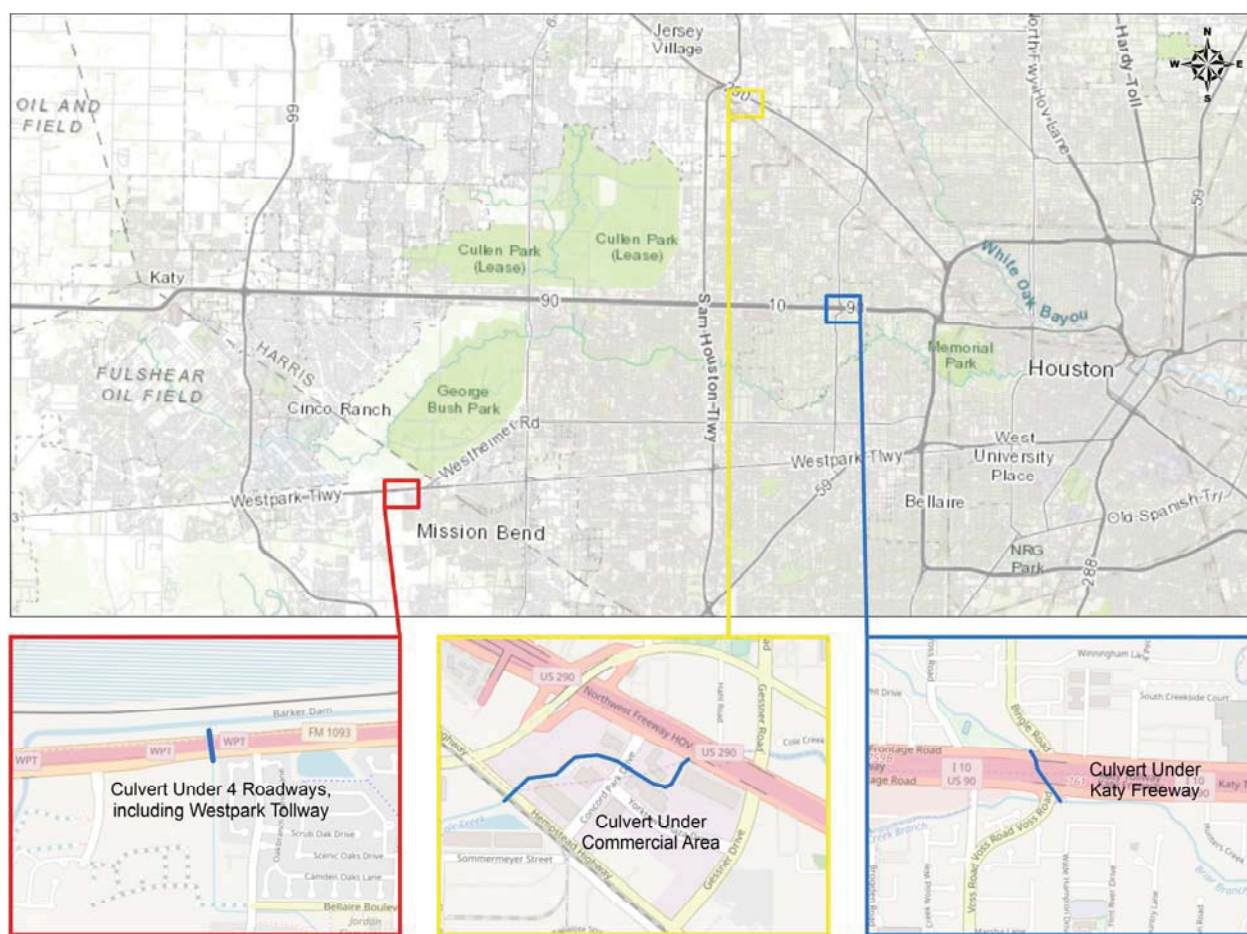


Figure 4.6: Major Culverts Represented in TELEMAC 2D model.

4.5 Model Calibration

Model calibration is completed by adjusting roughness and hydrologic loss parameters so that the model agreement with measured gage data within the Focus Area and Focus Period is maximized.

The objective of the TELEMAC model calibration is two-fold: 1) to capture the peak water surface elevations and their timing within the Focus Area during the Focus Period; and 2) to capture the rise (in downstream

areas) and the fall (in upstream areas) in water surface elevations within the Focus Area due to releases from Addicks and Barker Reservoirs.

4.5.1 Acceptable Criteria

This section defines a set of model performance metrics to help identify acceptable model calibration results within the focus area. These performance metrics have been defined considering the following:

- The main objective of the numerical model is estimation of inundation. As such, modelled stage (or water surface) elevations are assigned the most stringent acceptable criteria.
- Known acceptable criteria used by similar studies for similar applications.
- Model limitations as described above in Section 4.3.5.
- Consideration of accuracy and operational ranges of measurements. Within the focus area, some of the stream gages were operating beyond their operational limits.

The target (or desired) model performance criteria defined by [44] are adopted for this study. The following metrics are used to evaluate the goodness of model calibration for river water depth (or stage height) within the Focus Area and Focus Period based on modelled and observed data:

- Root mean square error percentage (RMSE%) less than 15% for all stations
- Pearson product-moment correlation coefficient (r)³⁵ greater than 0.9 for all stations

For flooding applications, the simulated free water surface elevation is the most important parameter since its spatial and temporal distribution defines overland flood depth and duration. Flow depth inside streams is of secondary importance since it is applicable to those streams. Since flow depth could be significantly impacted by local conditions at the points at which they are extracted (such as erroneous channel bed elevations, abrupt topographic changes in channel bed, rapidly varied flows that may not be represented by the model, etc.) they are much less reliable than water surface elevations for estimating overland flooding characteristics³⁶. For the purpose of model calibration, the RMSE% will be calculated for both water surface elevations and flow depths. For the purpose of estimating overland flooding extents and durations, water surface elevations will be used.

4.5.2 Flood Wave Speed Test

A flood wave speed test was completed using the TELEMAC model in order to verify this characteristic of the flood wave. A discharge signal of 4,200 cfs over 18 hours, with two 6-hour ramp up and ramp down periods, was released from Barker Dam (near Highway 6). Figure 4.7 shows the simulated stage elevations below Barker Dam at different stages using roughness values within the ranges presented in Table 4.6. Results show that the peak elevation corresponding to the flood wave at Piney Point is lagging the peak of the discharge signal by approximately 10 - 11 hours. This is consistent with the estimated time of travel for peak flows along lower Buffalo Bayou that is reported by the Reservoir Regulation Manual of 1962 [17]. It was estimated³⁷ that peak flows reach the mouth of Rummel Creek in approximately 6.4 hours and reach Piney Point Road in approximately 10.2 hours [17, p. USACE599479]. The Corps estimates compare well with the model results. It is noted that channel roughness, runoff discharge and release rates affect the travel time through Buffalo Bayou. Therefore, calibration of Manning's roughness values is essential, which is addressed below in Section 4.5.5.

³⁵ A value of correlation coefficient " r " closer to 1 indicates better fit between modelled and measured data.

³⁶ If flow depths were used to estimate overland flooding, the results may be significantly skewed as a result of any inaccuracies in local land or bed elevations.

³⁷ USACE used the coefficient method to route the discharge downstream [17, p. USACE599477].

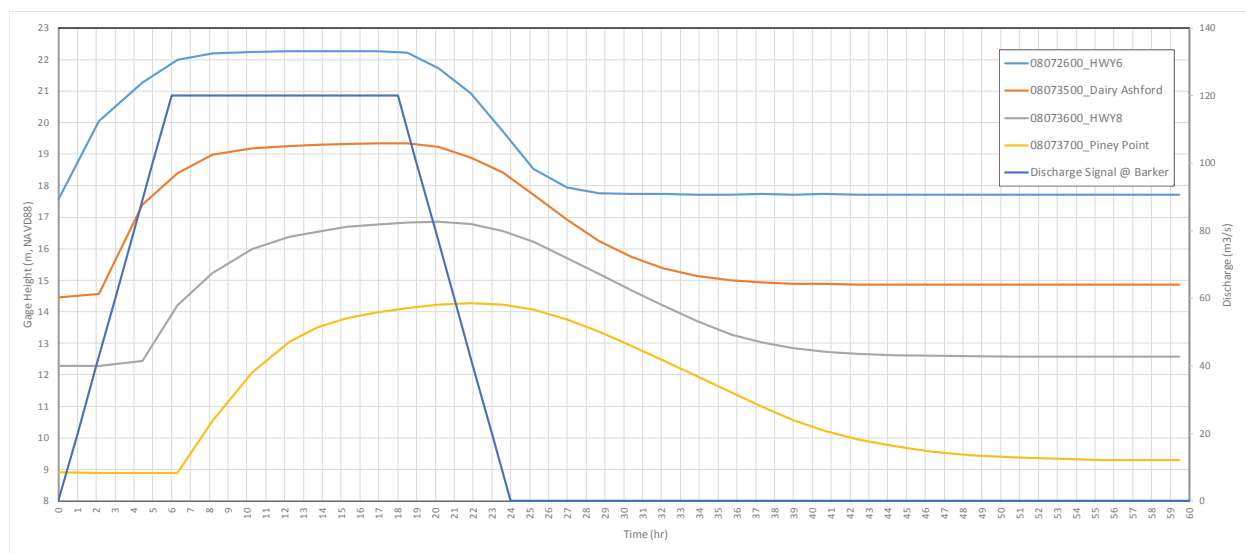


Figure 4.7: Propagation of flood wave along lower Buffalo Bayou. The 0 hour is the start of the discharge signal from Barker Reservoir (refer to the dark blue line).

4.5.3 Initial Conditions (August 25, 2017)

4.5.3.1 Base Flows and Stages

To establish base flows in Buffalo Bayou and its major tributaries, a hypothetical TELEMAC 2D model run was completed with the objective of filling the streams up to observed stage elevations on 8/25/2017 00:00. For the purpose of this run, a uniform rainfall intensity of 0.5 in/hr was applied to the entire model domain over a duration of 12 hours with a constant Curve Number (CN) = 99 throughout the entire domain. Prior to the Harvey Event, flow through streams and bayous within the Focus Area were insignificant. Therefore, base flows are expected to have a negligible effect on model results.

4.5.3.2 Antecedent Soil Moisture Conditions

The Antecedent Moisture Condition (AMC) represents the amount of water in the soil prior to the rainfall event under consideration. It is a modification of CN values to reflect the effects of prior rainfall events and soil moisture conditions.

In conceptual terms, AMC affects the abstractive hydrological losses (including the ability of the soil to absorb water during a rainfall event), and therefore affects the amount of runoff generated from a given area. The AMC is categorized into three conditions: AMC I, AMC II, and AMC III. AMC I represents soils that are dry and are able to infiltrate a greater amount of water (generating less runoff), AMC II represents soils that have an average moisture condition, and AMC III represents soils that are wet and are less able to infiltrate water (generating more runoff).

The antecedent moisture content of a soil depends on:

- Intensity, duration and timing of prior rainfall events
- Soil type; in particular, soil texture
- Slope length and steepness
- Position of an area within a watershed
- Land use and land cover

- Human modifications, such as irrigation and drainage

In the SCS-CN method, the use of different AMC values is a method of accounting for part of the variability in the rainfall-runoff relationship. AMC II is used to represent the central values in the rainfall-runoff relationship, whereas AMC I represents conditions of lower runoff potential and AMC III represents conditions of higher runoff potential. As such, AMC is a surrogate to account for the variability in the rainfall-runoff relationship, and it becomes a method of calibrating the amount of runoff predicted by the SCS-CN approach.

The SCS method prescribes AMC selection based on the total 5-day antecedent rainfall, and whether the area is in the dormant or growing season (SCS, 1985 [45]). However, this relationship was developed for an unspecified region, not accounting for regional differences or scale effects. Echoing this concern, SCS deleted this relationship from the 1993 [46] update of the approach [47].

In practice, AMC category is typically selected by the modeler to produce the best fit between predicted and observed runoff values. Estimated conditions of soil moisture content prior to the Harvey Event were relied on to determine the variation in AMC across the study area, and then the resultant runoff predictions were validated against gage observations. The sensitivity of the model was also tested with varying AMC values, and it was confirmed that the final choice of AMC values provided the most appropriate fit to observed runoff (refer to Section 4.5.5).

For the Harvey Event, the antecedent soil moisture predictions were available from NASA (Figure 4.8). The soil moisture content dataset shown in the figure is a 3-km resolution Volumetric Soil Moisture of the soil profile³⁸. AMC varied significantly from west of downtown Houston to east of downtown Houston. In the figure, the red and grey areas represent a low AMC, the green areas represent a high AMC, and the other colored areas represent moderate AMC. Consistent with these data, areas to the northwest of the domain were assigned curve numbers for AMC I, soils upstream of the dams were assigned curve numbers for AMC II, and soils in the remainder of the domain were assigned curve numbers for AMC III. Figure 4.9 shows the AMC categories assigned to the sub-watersheds.

The antecedent moisture conditions for the watersheds were used to assign curve numbers throughout the model domain. Curve number can be adjusted using the following equations for AMC I and AMC III [48]:

$$CN_{AMC\ I} = \frac{4.2 \times CN_{AMC\ II}}{10 - 0.058 \times CN_{AMC\ II}}$$

$$CN_{AMC\ III} = \frac{23 \times CN_{AMC\ II}}{10 + 0.13 \times CN_{AMC\ II}}$$

The values from the SCS method (see Table 4.2) represent the curve numbers for AMC II. For AMC I, the curve number will decrease, which allows for greater hydrological losses. For AMC III, the curve number will increase, which allows for less hydrological losses. The curve number map (Figure 4.10) used as input to the TELEMAC 2D model was prepared based on AMC (Figure 4.9), land use (Figure 4.4) and HSG (Figure 4.5).

³⁸ NASA's predictions are based on real-time SPoRT-LIS (Short-term Prediction Research and Transition Center - Land Information System) [61]. "The real-time LIS consists of a continuous integration of the Noah land surface model which is same land surface model used in the operational National Centers for Environmental Prediction (NCEP) North American Mesoscale model."

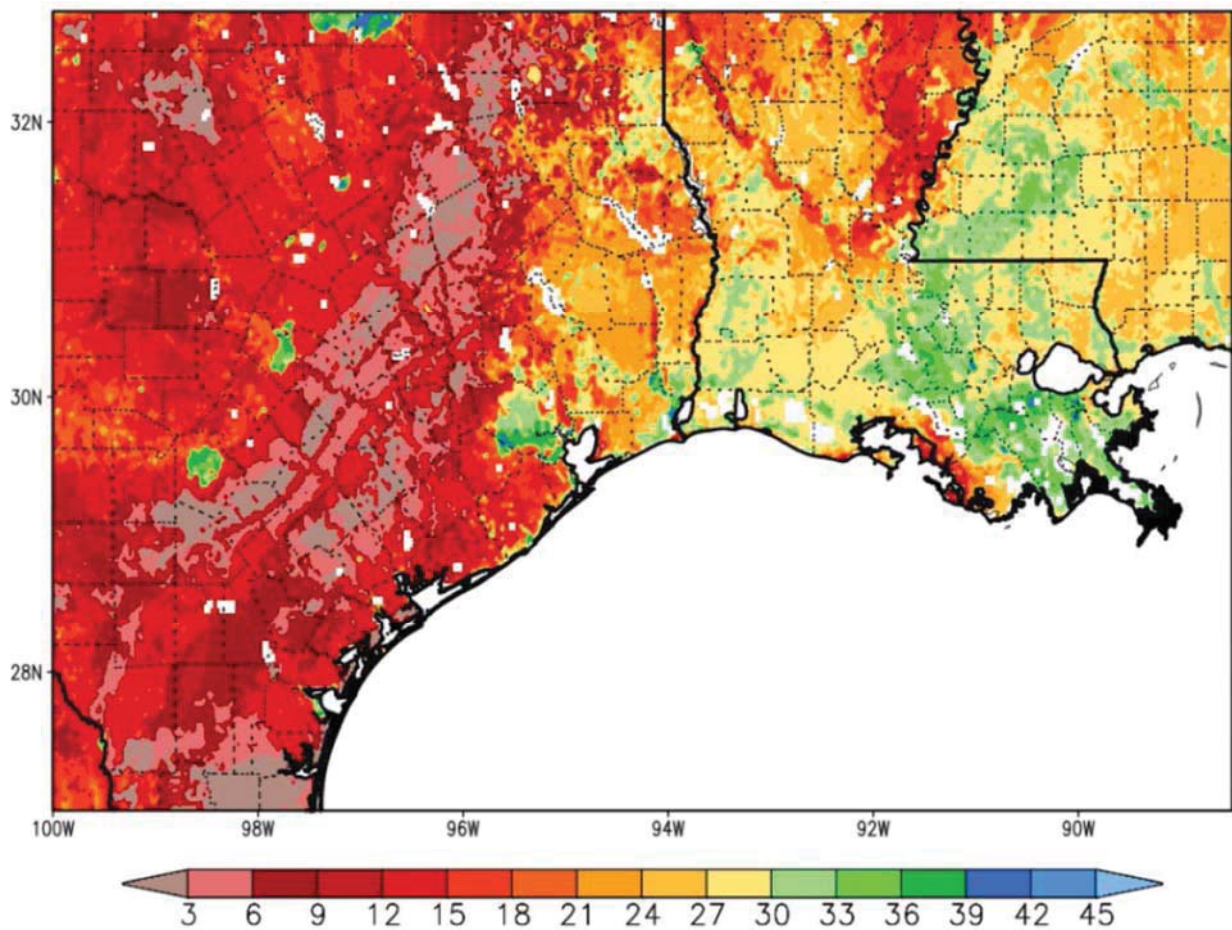


Figure 4.8: Percent volumetric soil moisture content, 8/25/2017 (NASA, n.d.) [49, p. FEMA000315]

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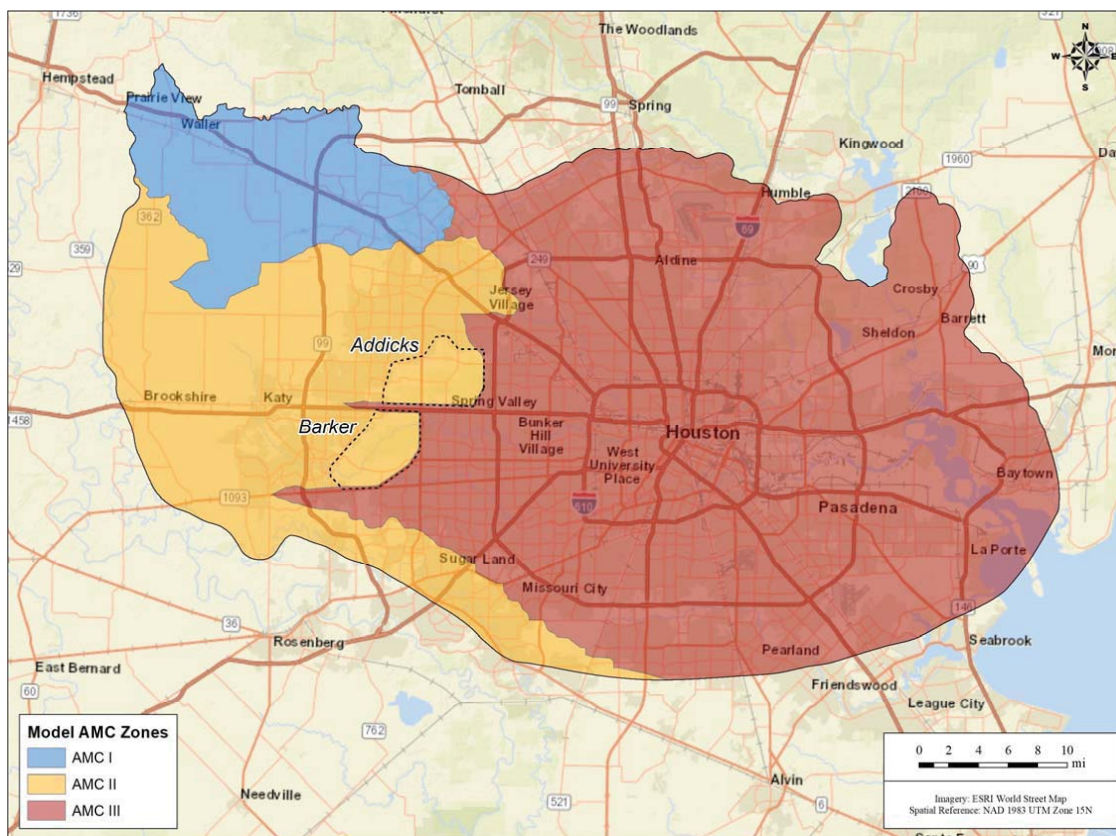


Figure 4.9: Antecedent soil moisture conditions for the model domain (yellow: AMC I, blue: AMC II; green: AMC III)

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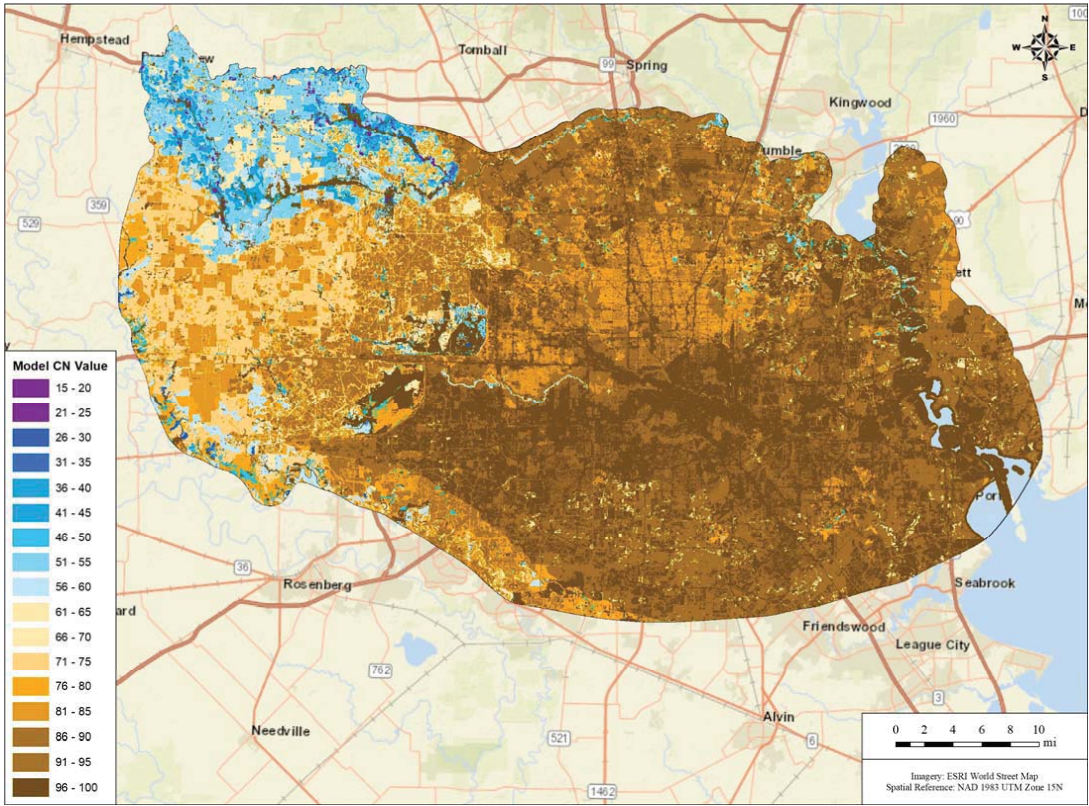


Figure 4.10: Curve Number Map covering the model domain.

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4.5.4 Model Sensitivity

4.5.4.1 Sensitivity to Courant Number (or Time Step)

The Courant number C is defined as follows:

$$C = u \frac{\Delta t}{\Delta x}$$

where u is the characteristic speed (flow speed or flood wave speed), Δt is the computational time step and Δx is the size of the computational grid (or mesh size) at a certain location with the model domain. A lower Courant number essentially dictates that a smaller computational time step may be required to represent a wave moving across mesh nodes. The TELEMAC 2D model employs an implicit solver, which is theoretically unconditionally stable, where relatively high Courant numbers (or longer time step) can be used. The model sensitivity to Courant number has been tested by comparing the model results for desired Courant numbers of 5 and 10. It is concluded that the model results are not sensitive to Courant numbers within the tested range. Explicit model solvers must operate in the range of Courant number less than 1.

4.5.4.2 Sensitivity to Rainfall Spatial Variability

The importance of rainfall spatial variability has been tested by comparison of model results for the following two scenarios:

- Spatially variable rainfall intensities (provided by [14]); and
- Spatially constant rainfall, where rainfall intensities measured at Barker Dam (near the center of the model domain) have been assumed to represent the entire domain.

Simulated water surface elevations under these scenarios were significantly different. It is concluded that rainfall spatial variability is of paramount importance and must be considered in the analysis.

4.5.4.3 Sensitivity to Time Interval of Rainfall Intensity

The model sensitivity to the time interval of rainfall intensity has been tested by running the model using HCFCF rainfall gage data with 15 minute and 1 hour intervals. It is concluded that for the Harvey Event, the model is not sensitive to time interval of rainfall intensity within the tested range, as the results are almost identical.

4.5.4.4 Sensitivity to Wind Forcing

The impact of wind has been tested by comparison between model results with and without wind forcing. The same roughness and infiltration parameters were used for both scenarios. It is concluded that the model is generally not sensitive to wind forcing and the hydraulics is dominated by rainfall, infiltration and runoff.

4.5.4.5 Sensitivity to Tides and Storm Surge Conditions

The impact of tidal conditions and storm surge at Galveston Bay on model results within the Focus Area has been tested by comparing model results for the following transmissive open boundary conditions at Galveston Bay:

- Actual measured water surface elevations (including tides and storm surge) imposed at the open boundary; and
- Stationary water surface elevation imposed at the open boundary.

Figure 4.11 illustrates an example of model results for both scenarios at USGS gage 08074000 at Shepherd Drive (located at the downstream limit of the Focus Area). Pearson product-moment correlation coefficients between results of these two scenarios at various stream gages within the Focus Area are summarized in Table 4.9. It is concluded that storm surge has not significantly impacted the flooding characteristics (neither depth nor duration) within the Focus Area.

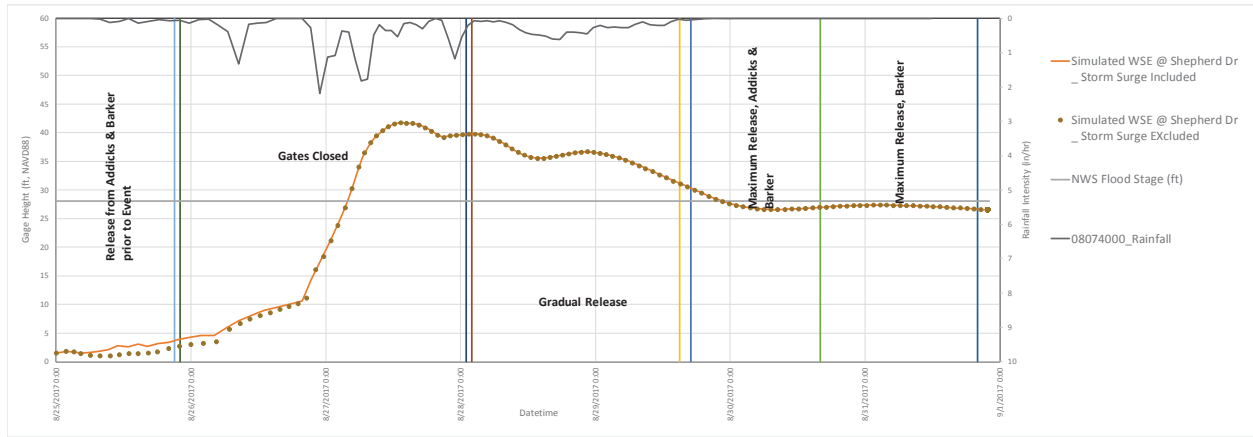


Figure 4.11: Simulated water surface elevations with and without storm surge at USGS Gage 08074000 at Shepherd Drive.

Table 4.9: Correlation between model results with and without storm surge

Stream Gage	R
Upstream of Addicks Dam	
08073000 @ Addicks Res.	1.000
08072760 @ Langham CK_1	0.999
HCFC_D_Horsepen Ck @ Trailside	0.999
08072800 @ Langham CK_2	1.000
08072730 @ Bear Ck	0.998
08072680 @ South Mayde Ck	1.000
Upstream of Barker Dam	
08072500 @ Barker Res.	1.000
08072350 @ Upper Buffalo Bayou	1.000
HCFC_D_Mason Cr @ Prince Cr Rd	1.000
Downstream of Addicks and Barker Gates	
08072600 @ Barker	1.000
08073500 @ Dairy Ashford Rd	0.999
HCFC_D_Rummel Creek @ Brittmoore Rd	0.994
08073600 @ Beltway 8	0.999
08073700 @ Piney Point	1.000
HCFC_D_Stage BB @ San Felipe	1.000
08074000 @ Shepherd Dr	0.999

4.5.4.6 Roughness and Hydrologic Loss Parameters

The model sensitivity to roughness and hydrologic loss parameters are addressed in Section 4.5.5.

4.5.4.7 Summary of Model Sensitivity

Table 4.10 provides a summary of the model sensitivity to various parameters. The “Base Run” column presents the parameters considered for model calibration and other production runs.

Table 4.10: Summary of TELEMAC model sensitivity results

Sensitivity Parameter	Base Run	Range tested	Conclusion
Courant Number	10	(5 – 10)	Not sensitive.
Rainfall spatial variability	Spatially variable	Spatially constant (using Gage 2010 at Barker Dam)	Spatial variability must be included.
Time interval of rainfall intensity	1 hour	(15 – 60) min	Model results are not sensitive within the tested range.
Wind	Time and space variable	Calm and Spatially and temporally varied wind	Model results are not sensitive to wind.
Tides and Storm Surge	Tides and storm surge included	No tide or storm surge; and Tides and storm surge included.	Within the Focus Area, the model results are not sensitive to tides or storm surges.

4.5.5 Development of Actual Hurricane Harvey Scenario

Measured stage elevations at various stream gages within the Focus Area were used to calibrate the two-dimensional TELEMAC model during the Focus Period (between 8/26/2017 and 9/12/2017) covering the entire period of reported flooding including two distinctive flow regimes downstream of the dams: 1) runoff dominated flow regime in lower Buffalo Bayou during the period of gate closure and most intense rainfall; and 2) flood wave dominated flow regime during the period of release from Addicks and Barker Reservoirs with no measurable rainfall.

4.5.5.1 Initial Calibration

The TELEMAC 2D model calibration was performed by changing roughness and hydrologic loss parameters within their respective realistic ranges (derived above in Section 4.4.3). For the purpose of initial calibration, RMSE% and correlation coefficient (r), as defined in Section 4.5.1, were calculated for each gage within the Focus Area and averaged over the following three zones:

- Zone A: Upstream of Addicks Dam
- Zone B: Upstream of Barker Dam
- Zone C: Downstream of Addicks and Barker Dams

Three channel roughness scenarios have been prepared for the purpose of model calibration as follows:

- Scenario I: Rough channels scenario
- Scenario II: Intermediate roughness scenario
- Scenario III: Smooth channels scenario

Manning's roughness maps representing the three roughness scenarios have been prepared as described in Table 4.11, where Manning's n ranges have been selected based on derived values (refer to Section 0).

Table 4.11: Ranges of Manning's n for stream and floodplains within the model domain

Topographic features	Manning's n		
	Scenario I (rough)	Scenario II (intermediate)	Scenario III (smooth)
Land areas including reservoirs	Manning's n defined by Mattocks & Forbes (2008) [42]		
Streets	0.013 [50, p. 111]		
All channels outside Focus Area	0.035 [50, p. 112]		
Zone A: Upstream of Addicks Dam			
Langham Creek (channel / floodplain)	0.04 / 0.1	0.03 / 0.1	0.02 / 0.1
Horsepen Creek (channel / floodplain)	0.04 / 0.1	0.03 / 0.1	0.02 / 0.1
Dinner Creek (channel / floodplain)	0.04 / 0.1	0.03 / 0.1	0.02 / 0.1
U106-13-00	0.08	0.05	0.02
Langham Creek Diversion channel	0.04	0.03	0.02
Bear Creek	0.04	0.03	0.02
South Mayde Creek (channel / floodplain)	0.08 / 0.1	0.05 / 0.1	0.02 / 0.1
Channel inside reservoir	0.04	0.03	0.02
Zone B: Upstream of Barker Dam			
Upper Buffalo Bayou	0.04	0.03	0.02
Willow Fork diversion channel	0.04	0.03	0.02
Mason Creek	0.04	0.03	0.02
Trib 52.9	0.04	0.03	0.02
Channel inside reservoir	0.04	0.03	0.02
Zone C: Downstream of Dams			
Buffalo Bayou from Barker gates to Dairy Ashford Road	0.08	0.05	0.02
Lower Langham Creek	0.06	0.04	0.02
Buffalo Bayou below Dairy Ashford Rd	0.06	0.04	0.02
Buffalo Bayou floodplain up to Dairy Ashford Road	0.22	0.22	0.22

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Buffalo Bayou floodplain below Dairy Ashford Road up to Piney Point	0.20	0.20	0.20
Buffalo Bayou floodplain below Piney Point	0.16	0.17	0.18
Rummel Creek (channel / floodplain)	0.06 / 0.22	0.04 / 0.22	0.02 / 0.22
Clodine Ditch (channel / floodplain)	0.035 / 0.22	0.025 / 0.22	0.015 / 0.22

Curve Number (CN) maps representing low, intermediate and high hydrological losses scenarios have been prepared as follows:

- CN Base Map 1 representing a low hydrologic losses scenario
 - AMC III assigned for areas downstream of Addicks and Barker Dams; and
 - AMC II assigned for areas upstream of Addicks and Barker Dams.
- CN Base Map 2 (Figure 4.10) representing an intermediate hydrologic losses scenario:
 - AMC III assigned for areas downstream of Addicks and Barker Dams;
 - AMC II assigned for areas upstream of Addicks and Barker Dams; and
 - AMC I assigned to areas for the northwest area of the model domain.
- CN Base Map 3 representing a high hydrologic losses scenario:
 - AMC III assigned for areas downstream of Addicks and Barker Dams; and
 - AMC I assigned for areas upstream of Addicks and Barker Dams.

Table 4.12 defines hydrologic losses and roughness parameters for the initial calibration runs representing the Harvey Event. The following model characteristics are common for all the runs:

- Rainfall intensities are based on gridded rainfall data derived by AWA (refer to Section 2.9)
- Bathymetry is defined by the 2008 LiDAR survey corrected for water depth using the HCFCD HEC-RAS transect data (refer to Section 2.4) and the 2018 LiDAR survey for Lower Langham Creek.
- Wind forcing is included
- Variable time step calculated based on a “desired”³⁹ Courant Number of 10.
- Simulation from 8/25/2017 2:00 to 9/6/2017 1:00 (12 days)

The results of the initial calibration runs were used to calculate RMSE% for Addicks and Barker pool depths (representing Zones A and B)⁴⁰ and average RMSE% of flow depths over Zone C. Table 4.13, Table 4.14 and Table 4.15 present calculated RMSE% representing Zones A, B and C, respectively. For all of the calibration runs, starting around 8/27 (when gates were closed) the model overestimates pool elevations higher than 98 ft and 93 ft in Addicks and Barker Reservoirs, respectively. Above those elevations, the simulated rates of rise are higher than observed. This trend is independent of the roughness and hydrologic loss scenario as shown. As such, this overestimated rate of rise could potentially be attributed to one or more of the following:

- Temporal and spatial differences between estimated and actual rainfall intensities;
- The relatively coarse mesh upstream of the Focus Area may not capture significant low-lying areas and/or detention ponds.

³⁹ The model calculates the next time step using the desired Courant number based on results at the present time step.

⁴⁰ Reservoir pool elevations are representative of their respective zones since they were controlling water surface elevations after 8/27/2017.

- Misrepresentation of the channel bathymetries upstream of the reservoirs⁴¹.
- Misrepresentation of the reservoirs topography above elevations 98 feet (Addicks) and 93 feet (Barker); and/or
- Significant change to the topography⁴² above those elevations between 2008⁴³ and 2017.

The overestimated pool elevations in Addicks and Barker Reservoirs may affect estimates of the timing of flooding in areas upstream of the reservoirs. The model is expected to estimate earlier peak elevations caused by backwater due to pool elevations higher than 98 feet and 93 feet in Addicks and Barker, respectively.

In addition, the model generally misses the first small peak of water surface elevation measured in most of the streams within the Focus Area at the early stages of the Harvey Event. This is likely attributed to storm drain flows (not included in the model) transferring water to the receiving bodies more rapidly than overland flow in the early stages of the storm (prior to surcharge of the drains)⁴⁴. The model, however, does well at predicting subsequent peaks of water surface elevation after storm drains became fully surcharged.

Table 4.12: Initial calibration model runs

Model Parameters	CN Base Map 1 (Low Hydrologic Loss Scenario)	CN Base Map 2 (Intermediate Hydrologic Loss Scenario)	CN Base Map 3 (High Hydrologic Loss Scenario)
I: Rough channels scenario	I-1	I-2	I-3
II: Intermediate roughness scenario	II-1	II-2	II-3
III: Smooth channels scenario	III-1	III-2	III-3

Table 4.13: RMSE% calculated for Addicks pool depths for all initial calibration runs (minimum value is bolded)

Model Parameters	CN Base Map 1 (Low Hydrologic Loss Scenario)	CN Base Map 2 (Intermediate Hydrologic Loss Scenario)	CN Base Map 3 (High Hydrologic Loss Scenario)
I: Rough channels scenario	6.48%	5.88%	7.08%
II: Intermediate roughness scenario	7.11%	6.45%	7.07%
III: Smooth channels scenario	7.85%	7.15%	7.26%

⁴¹ Unlike streams downstream of the reservoirs, elevations derived from HEC-RAS cross sections upstream of the reservoirs are very similar to the 2008 LiDAR.

⁴² Such as excavation works above elevations 98 feet and 93 feet upstream Addicks and Barker, respectively.

⁴³ At the time of drafting this report, the 2008 LiDAR survey is the most recent source of reservoir topographies.

⁴⁴ This model is developed for and suited to extreme precipitation events, assuming storm drains are surcharged.

Table 4.14: RMSE% calculated for Barker pool depths for all initial calibration runs (minimum value is bolded)

Model Parameters	CN Base Map 1 (Low Hydrologic Loss Scenario)	CN Base Map 2 (Intermediate Hydrologic Loss Scenario)	CN Base Map 3 (High Hydrologic Loss Scenario)
I: Rough channels scenario	6.42%	6.33%	7.72%
II: Intermediate roughness scenario	6.35%	6.29%	7.42%
III: Smooth channels scenario	6.38%	6.35%	7.04%

Table 4.15: RMSE% averaged over Zone C for all initial calibration runs (minimum value is bolded).

Model Parameters	CN Base Map 1 (Low Hydrologic Loss Scenario)	CN Base Map 2 (Intermediate Hydrologic Loss Scenario)	CN Base Map 3 (High Hydrologic Loss Scenario)
I: Rough channels scenario	9.50%	9.37%	9.29%
II: Intermediate roughness scenario	9.25%	9.24%	9.35%
III: Smooth channels scenario	10.94%	11.05%	11.36%

4.5.5.2 Detailed Calibration

Results of the initial model calibration show that the optimum calibration for Zones A, B and C is at or near the center of the parameter space, corresponding to intermediate hydrologic loss and roughness scenarios (II-2). This provides general guidance for overall range of loss and roughness parameters. As shown from Table 4.13, Table 4.14 and Table 4.15, the minimum RMSE% for all zones are associated with the use of the CN Map 2, which is in agreement with the estimated antecedent moisture conditions presented in Figure 4.9.

For the purpose of detailed calibration, another CN map has been generated based on CN Maps 2 and 3, as follows:

$$CN_4 = 0.9 \times CN_2 + 0.1 \times CN_3$$

Detailed calibration runs of the Harvey Event extending up to 9/14/2017 23:00 covering the entire Focus Period have been completed, where variations to Run II-2 Manning roughness coefficients and CN maps have been tested. Table 4.16 describes the detailed calibration runs. It was found that results of Run D07 yield the least RMSE% and the highest correlation coefficient within the Focus Area and the Focus Period. Table 4.17 presents RMSE%, correlation coefficients and bias calculated over the Focus Period for all the gages considered within the Focus Area using the results of D07. Results presented in Table 4.17 meet the acceptance criteria defined in Section 4.5.1.

The following list summarizes the calibrated Manning's n within the Focus Area (Zones A, B and C):

- Channels Upstream of Addicks Dam (Zone A):

- Langham Creek & Horsepen Creek are assigned Manning's $n = 0.10$ (floodplain) and $n = 0.03$ (channel)
- Dinner Creek is assigned Manning's $n = 0.03$ (channel)
- U106-13-00 is assigned Manning's $n = 0.05$
- Langham Creek diversion channel is assigned Manning's $n = 0.03$
- Bear Creek is assigned Manning's $n = 0.03$
- S. Mayde Creek is assigned Manning's $n = 0.10$ (floodplain) and $n = 0.05$ (channel)
- Channels inside reservoir are assigned Manning's $n = 0.03$
- Channels Upstream of Barker Dam (Zone B):
 - Upper Buffalo Bayou is assigned Manning's $n = 0.03$
 - Willow Fork Diversion Channel is assigned Manning's $n = 0.03$
 - Mason Creek is assigned Manning's $n = 0.03$
 - Tributary 52.9 is assigned Manning's $n = 0.03$
 - Channels inside reservoir are assigned Manning's $n = 0.03$
- Channels Downstream of the Dams (Zone C):
 - Lower Buffalo Bayou floodplain is assigned Manning's $n = 0.22$ up to Beltway 8; $n = 0.20$ from Beltway 8 to Piney Point and $n = 0.17$ from Piney Point to Shepherd Dr.
 - Lower Buffalo Bayou channel between Barker gates and Dairy Ashford Road is assigned Manning's $n = 0.06$
 - Lower Buffalo Bayou channel between Dairy Ashford Road and Beltway 8 is assigned Manning's $n = 0.04$
 - Lower Buffalo Bayou channel between Beltway 8 and Piney Point Road is assigned Manning's $n = 0.04$
 - Lower Buffalo Bayou channel between Piney Point Road and Shepherd Dr. is assigned Manning's $n = 0.04$
 - Lower Langham Creek (downstream of Addicks gates) is assigned Manning's $n = 0.05$
 - Rummel Creek channel is assigned Manning's $n = 0.06$
 - Clodine Ditch is assigned Manning's $n = 0.22$ (floodplain) and $n = 0.035$ (channel)

The calibrated model (Run D07 or The Actual Harvey Run) predicts peak water surface elevations and their timings within the Focus Area with a high degree of certainty. Differences between measured gage heights and simulated water surface elevations can be summarized as follows:

- The model overestimates pool elevations in Addicks and Barker Reservoirs between midday 8/27/2017 and midday 8/29/2017;
- The model underestimates pool elevations in Addicks Reservoir after 8/30/2017;
- The model overestimates water surface elevations downstream of the Beltway 8 after 9/5/2017.
- The model predicts peak pool elevations in both reservoirs about 1 day earlier than the timing of the peak pool elevation derived from the gage data.
- The model predicts the start of the spill around the north end of Addicks reservoir about 15 hours earlier than what is perceived by gage data. However, the model correctly estimates the duration of the period of spill around north end of Addicks.
- For all the streams draining into the reservoirs, the model does not capture the first water surface elevation peak that occurred the morning of 8/26/2017. However, the model captures all the other subsequent higher water surface elevation peaks.

Table 4.16: Summary of detailed calibration runs

Run ID	Variation to Run II-2	CN Map
D01	Rough channels scenario downstream of the dams. Floodplains roughness as per II-2.	2
D02	Rough channels scenario downstream of the dams. Floodplains roughness as per II-2 except below Piney Point where $n = 0.16$.	2
D03	Clodine Ditch: $n = 0.035$ (channel) and 0.22 (floodplain)	2
D04	Clodine Ditch: $n = 0.035$ (channel) and 0.22 (floodplain) Wind forcing not included	2
D05	Clodine Ditch: $n = 0.035$ (channel) and 0.22 (floodplain) Buffalo Bayou channel from Barker gates to Dairy Ashford Rd: $n = 0.08$	2
D06	Clodine Ditch: $n = 0.035$ (channel) and 0.22 (floodplain)	4
D07	Refined model bathymetry ⁴⁵ . Clodine Ditch: $n = 0.035$ (channel) and 0.22 (floodplain)	2

Table 4.17: Calculated calibration metrics for the Actual Harvey Run (D07)

Gage	RMSE% (Elevation)	RMSE% (Depth)	R	Bias
Zone A: Upstream of Addicks Dam				
08073000 @ Addicks Res.	1.38	4.97	0.99	0.00
08072760 @ Langham CK_1	1.24	20.62**	0.98	-0.01
HCFC_D_Horsepen Ck @ Trailside	1.53	24.35**	0.94	0.00
08072800 @ Langham CK_2	1.47	39.90**	0.95	0.00
08072730 @ Bear Ck	1.77	46.16**	0.96	-0.01
08072680 @ South Mayde Ck	1.88	36.22**	0.96	-0.01
Zone B: Upstream of Barker Dam				
08072500 @ Barker Res.	1.02	5.05	0.99	0.00
08072350 @ Upper Buffalo Bayou	1.45	16.57**	0.95	-0.01
HCFC_D_Mason Cr @ Prince Cr Rd	0.89	15.79**	0.97	0.00
Zone C: Downstream of Addicks and Barker Gates				

⁴⁵ Refined model bathymetry includes removal of blockages at Horsepen, Bear and Langham Creeks and adjustment of Lower Langham Creek bed elevation to match the 2018 LIDAR.

08072600 @ Barker	1.53	8.07	0.99	-0.01
08073100 @ Addicks	1.11	5.92	0.99	0.01
08073500 @ Dairy Ashford Rd	1.37	5.05	0.99	-0.01
HCFCFCD_Rummel Creek @ Brittmoore Rd	1.39	22.35**	0.97	0.00
08073600 @ Beltway 8	1.55	4.63	0.99	0.00
08073700 @ Piney Point	2.12	5.50	0.99	0.00
HCFCFCD Stage BB @ San Felipe St.	2.99	8.90	0.98	0.02
08074000 @ Shepherd Dr	7.51	7.82	0.92	0.02

* Calibration metrics calculated over the period from 8/28/2017 7:00 to 9/12/2017 23:00 due to doubts over reliability of gage height data at Shepherd Drive gage.

** High RMSE% values are due to incorrect channel bathymetries (refer to Section 2.4.1).

4.6 Model Validation

4.6.1 High Water Marks

Following (and during) the Harvey Event, HCFCFCD and USGS collected elevations of high water marks (HWM) at various locations. Locations of these high water marks within the Focus Area are presented in Figure 4.12 and Figure 4.13, totaling 262 HWM (57 by HCFCFCD and 205 by USGS). High water mark elevations represent the highest water surface elevation reached at their respective locations shortly before the date they were surveyed.

Some of the USGS HWMs were collected from bridges across lower Buffalo Bayou. During the Harvey Event, some of the bridge decks within the Focus Area were overtopped. As such, HWMs at bridge decks may underestimate peak water surface elevations. In addition, locations of HWMs at bridge decks along lower Buffalo Bayou are covered by gage data. Therefore, the HWMs were filtered by removing repeated marks and HWMs at bridge decks. The total number of filtered HWMs within the Focus Area is 169 (50 by HCFCFCD and 119 by USGS).

Simulated peak water surface elevations were compared to elevations of high water marks within the Focus Area. Figure 4.14 and Figure 4.15 present distributions of percent error in estimated peak water surface elevations within the Focus Area based on USGS and HCFCFCD HWMs, respectively. These figures show that the model estimates peak water surface elevations within the Focus Area with a high degree of certainty.

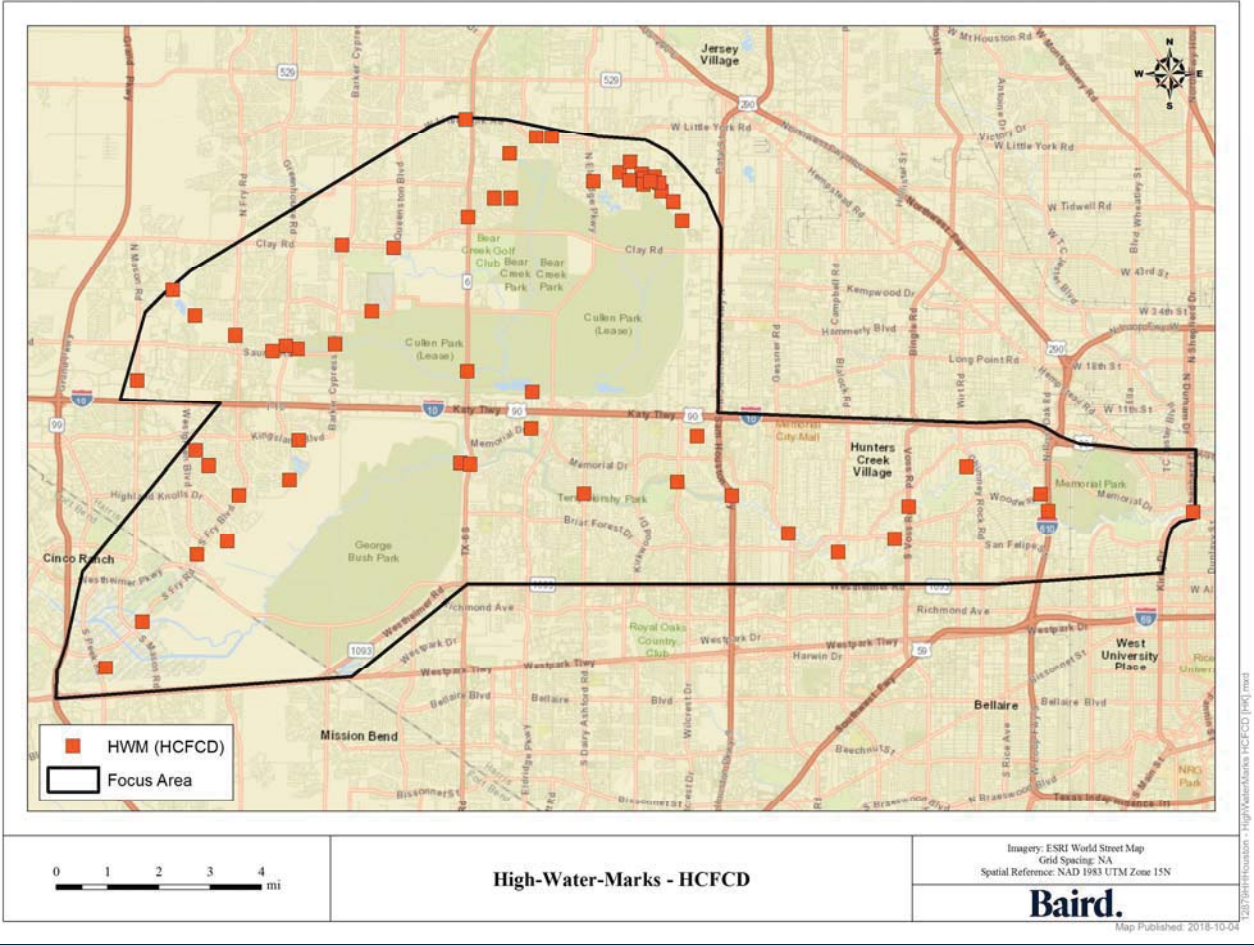


Figure 4.12: Map of High-Water Marks collected by HCFCF

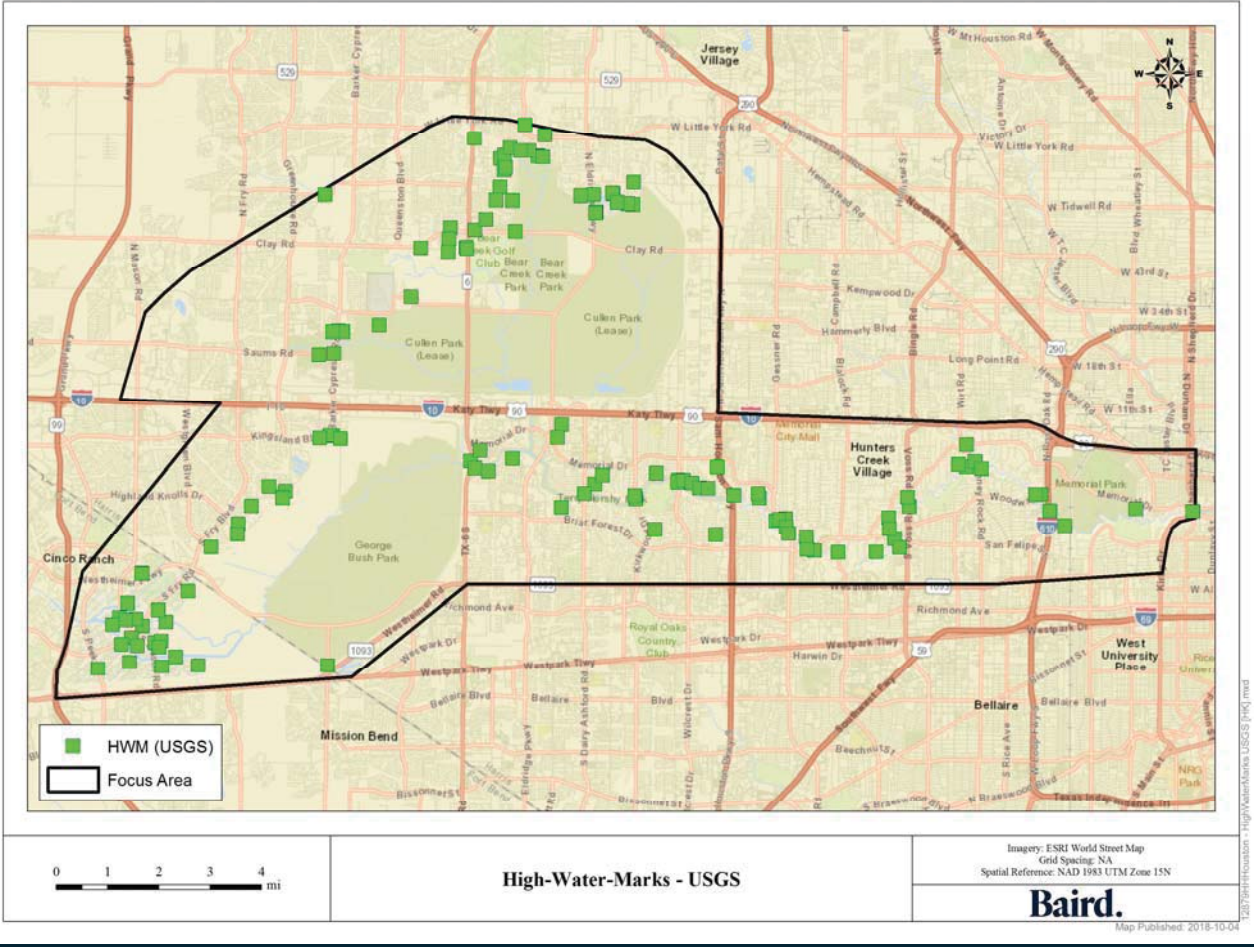


Figure 4.13: Map of High-Water Marks collected by USGS

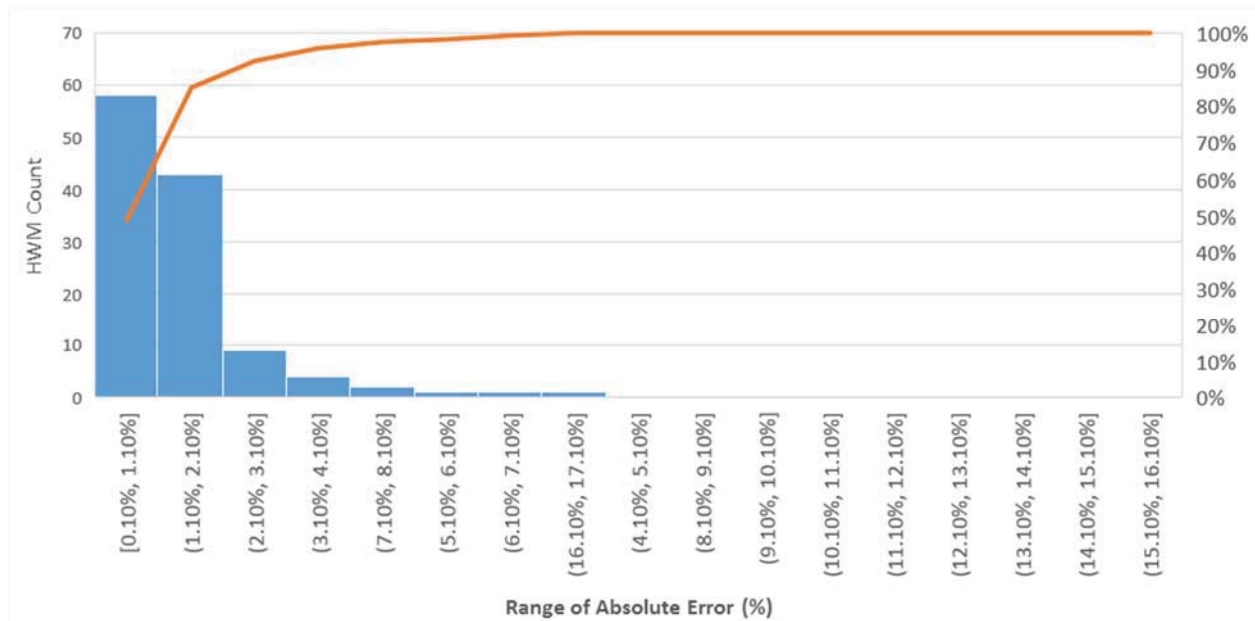


Figure 4.14: Distribution of % error in simulated peak water surface elevations (USGS HWMs)

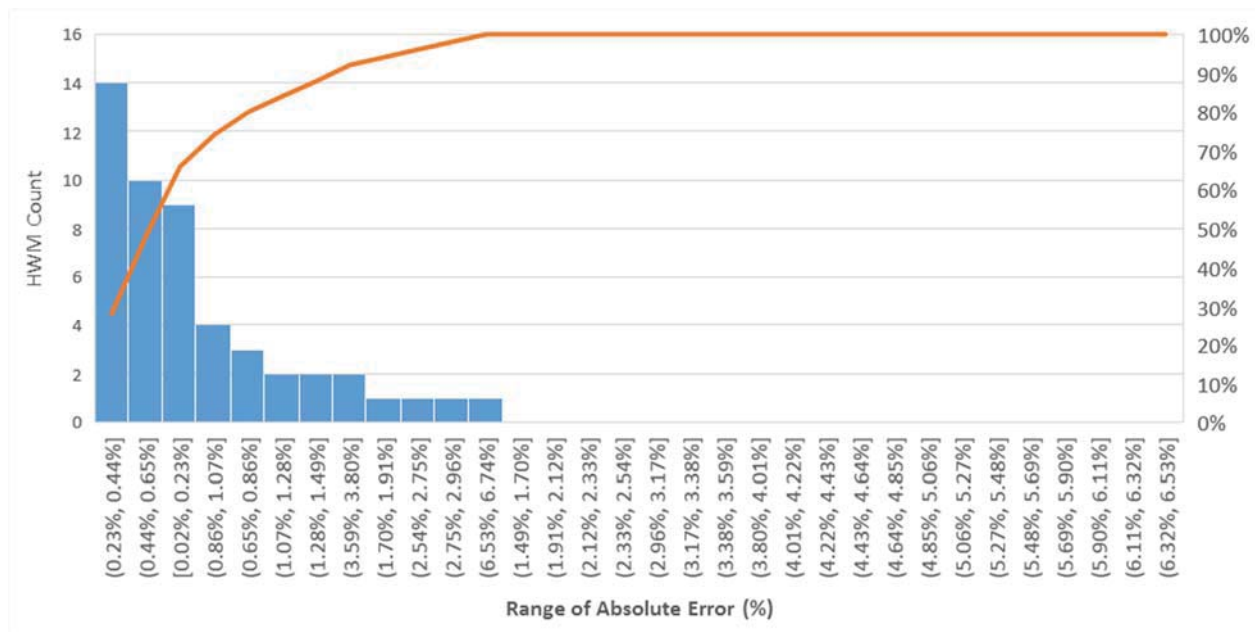


Figure 4.15: Distribution of % error in simulated peak water surface elevations (USGS HWMs)

4.6.2 Inundation Limits

For the assessment of the agreement between the simulated inundation extents and the observed water marks from aerial imagery, the procedure proposed by [51] is adopted, whereby the F1 index is defined as follows:

$$F1 = \frac{A}{A + B + C}$$

where, A to D represent the areas predicted wet or dry by the model and observed in the imagery data, as described in Table 4.18. F1 ranges from 0% (where there is no overlap between predicted and observed wet areas) to 100% (where observed and predicted wet areas coincide). As such, F1 index represents the degree of agreement between observed and predicted inundation limits as a percentage.

Observed inundation limits developed in Section 3.6 were compared to the model results. The NOAA mosaic aerial photos dated 8/30/2018 were acquired between 17:13 and 18:19. Therefore, inundation depths across the entire model domain were extracted on the nearest time step. Figure 4.16, Figure 4.17 and Figure 4.18 compare between observed and simulated inundation limits on 8/30/2018 in areas upstream Addicks Reservoir, upstream Barker Reservoir and downstream of the dams, respectively. The green area (Area A) represents agreement between observed and simulated limits, while Areas B (red) and C (blue) indicate overprediction and underprediction, respectively.

The F1 index was calculated for several parts downstream of the dams as follows:

- 84% below the reservoirs down to Shepherd Dr
- 87% below the reservoir down to Beltway 8
- 80% below Beltway 8 down to Shepherd Dr

It is concluded that the calibrated model estimates inundation limits within the Focus Area with a high degree of certainty.

Table 4.18: Parameters used to calculate the goodness of the fit between observed and predicted inundation limits. A and D represent areas predicted correctly.

	Model Wet	Model Dry
Image Wet	A	C (underprediction)
Image Dry	B (overprediction)	D

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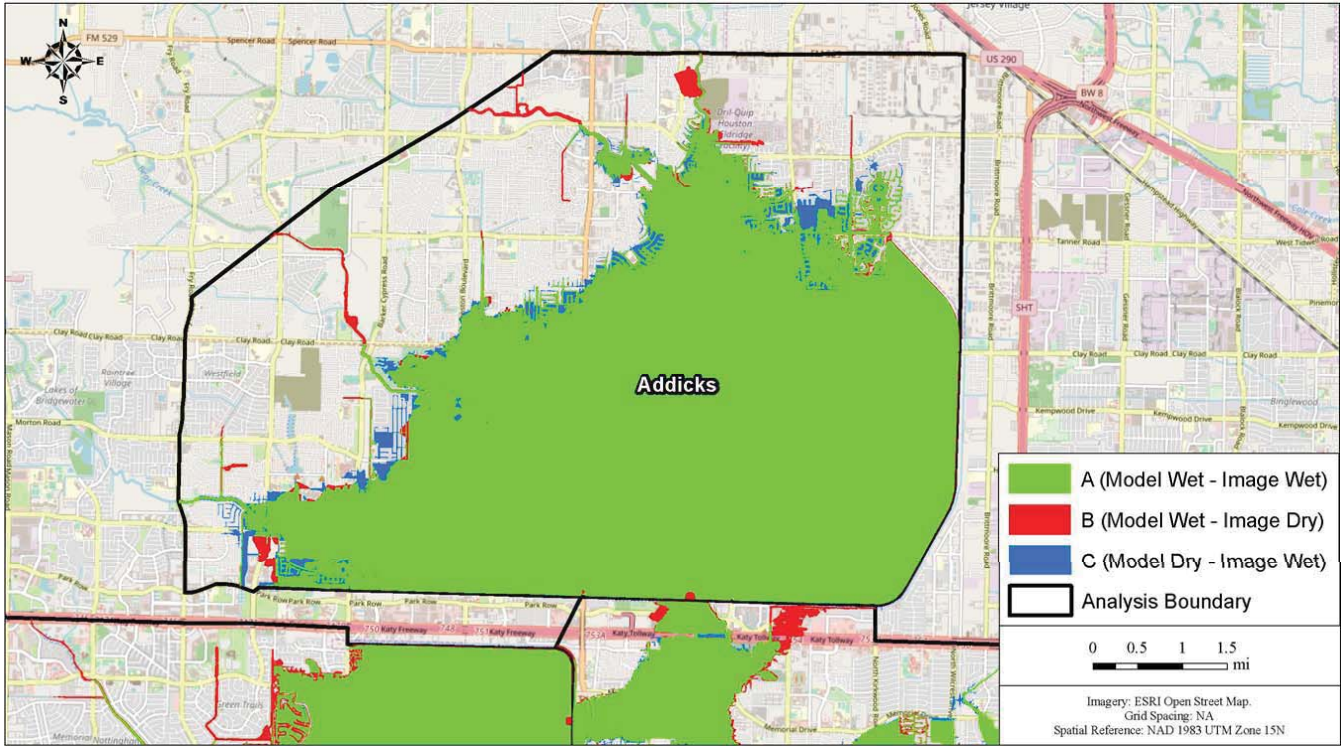


Figure 4.16: Comparison between simulated and observed inundation limits upstream of Addicks Reservoir on 8/30/2017.

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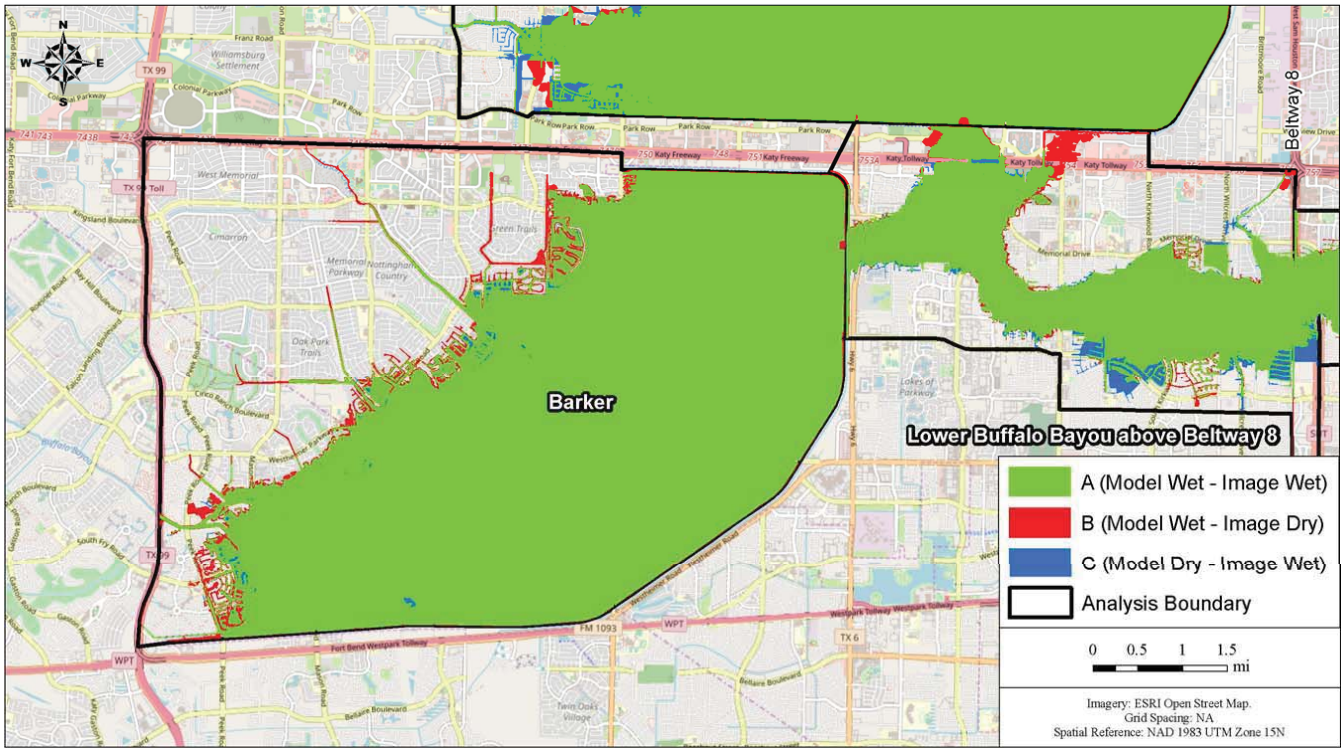


Figure 4.17: Comparison between simulated and observed inundation limits upstream of Barker Reservoir on 8/30/2017.

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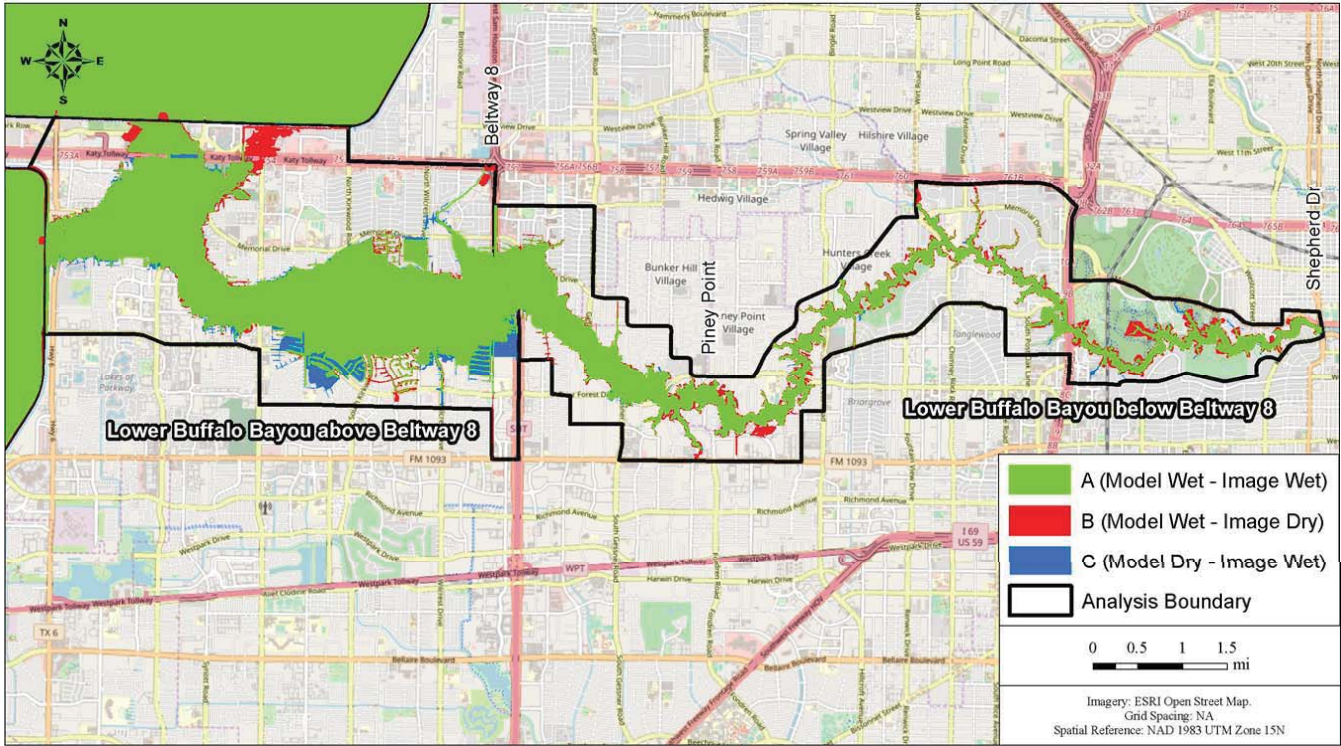


Figure 4.18: Comparison between simulated and observed inundation limits downstream of Addicks and Barker Reservoirs on 8/30/2017.

5. Hydraulic Modeling of Physical Scenarios

We used the TELEMAC 2D to assess flooding characteristics within the Focus Area associated with historical storms (including the Harvey Event) under various scenarios. This section provides a description of the model scenarios and presents results of simulated water surface elevations for each scenario at each Test Property.

5.1 Model Representation of Historical Conditions

Historical land use/cover is used to represent infiltration and roughness parameters associated with changing conditions through time. On the other hand, model topography is used to represent changes through time to bayous, dams, dikes, ponds, etc. Table 5.1 summarizes the data used to derive roughness and infiltration parameters representing various historical land uses. The table also summarizes the source of topographic information for the different model scenarios.

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Table 5.1: Summary of physical parameters of historical model runs

Year	Land use source	Hydrologic Losses	Roughness	Topography
1975	[40]	Based on: <ul style="list-style-type: none"> • AMC map prior to Hurricane Harvey Event • Hydrologic Soil Groups as defined in Figure 4.5 	Manning's n based on: <ul style="list-style-type: none"> • Land use for land areas. • Calibrated roughness for all historic streams within the domain. 	2001 LiDAR [52]
1994	1992 NLCD [41]		Manning's n based on: <ul style="list-style-type: none"> • Land use for land areas. • Calibrated roughness for all historic streams within the domain. 	2001 LiDAR [52]
2001	2001 NLCD [41]		Manning's n based on calibrated roughness.	2001 LiDAR [52]
2008 to 2017	2011 NLCD [37]		Manning's n based on calibrated roughness.	2008 LiDAR [8], 2014 LiDAR [10], 2018 LiDAR [42] and HCFCD stream surveys [11].

5.2 Model Scenarios

Table 5.2 provides a description of Harvey-related TELEMAC 2D model scenarios. We analyzed the following conditions:

- Actual Harvey Run: Representing actual Harvey Event conditions upstream and downstream of the dams (developed in Section 4.5.5).
- No Project Run (I and II): Representing hypothetical conditions without the dams; without channel improvements (No Project Run I) and with channel improvements (No Project Run II).
- Gates Open Run: Representing actual Harvey Event conditions upstream and downstream of the dams under the hypothetical scenario where gates were never closed and maximum releases were made.

In addition to model runs related to the Harvey Event, Table 5.3 provides a description of TELEMAC 2D model runs simulating other historical storms without the dams and without other federal improvements on Government Owned Land (GOL).⁴⁶

⁴⁶ The Government Owned Land (GOL) behind Addicks and Barker dams is defined by [62, p. USACE596855]

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Table 5.2: Harvey-related TELEMAC 2D model runs

Model Run	Reservoir and Upstream Status	Downstream Status	Release
Actual Harvey	Actual	Actual	Actual
No Project I	<p>Present urbanized conditions without the dams and without the federal improvements on GOL (1940 era conditions on GOL and present conditions on private land).</p> <ul style="list-style-type: none"> Topography as per the Actual Harvey Run without federal improvements on federal property and without the dams. Channel roughness as per the Actual Harvey Run Land use as per the Actual Harvey Run 	<p>Present urbanized conditions without the federal improvements.</p> <ul style="list-style-type: none"> Topography as per the Actual Harvey Run with the following changes: <ul style="list-style-type: none"> Lower Langham Creek and Turkey Creek connected to the upper Creeks and W190-00-00** connected to upper Buffalo Bayou. Rectified section of lower Buffalo Bayou removed, and the 1940s era unrectified lower Buffalo Bayou introduced*. Channel roughness as per the Actual Harvey Run Land use as per the Actual Harvey Run 	Not applicable
No Project II	<p>Present urbanized conditions including federal channel improvements without the dams.</p> <ul style="list-style-type: none"> Topography as per Actual Harvey Run without the dams Channel roughness as per Actual Harvey Run Land use as per Actual Harvey Run 	<p>Actual (urbanized)</p> <ul style="list-style-type: none"> Topography as per Actual Harvey Run with lower Langham Creek and Turkey Creek connected to the upper Creeks and W190-00-00** connected to upper Buffalo Bayou Channel roughness as per Actual Harvey Run Land use as per Actual Harvey Run 	Not applicable
Gates Open	As per the Actual Harvey Run	As per the Actual Harvey Run	Ungated conduits (maximum)

* prepared based on Addicks and Barker Construction Drawings [53, p. USACE020403] and [54, p. USACE067122]

** Also known as "Clodine Ditch"

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Table 5.3: TELEMAC 2D model runs for other storms

Year of Storm	Reservoir and Upstream Status	Downstream Status
2001 (Jun, TS Allison)	Urbanized conditions as per 2001 without the dams and the federal improvements on GOL (1940 era conditions on GOL and 2001 conditions on private land). <ul style="list-style-type: none"> Topography as per 2001 LiDAR survey without dams and all other federal improvements Channel roughness as per Actual Harvey Run Land use as per 2001 NLCD 	Urbanized conditions as per 2001 without the federal improvements. <ul style="list-style-type: none"> Topography as per 2001 LiDAR with the unrectified lower Buffalo Bayou and with lower Langham and Turkey Creeks connected to the upper Creeks Channel roughness as per Actual Harvey Run Land use as per 2001 NLCD
2016 (Apr, Tax Day)	Present urbanized conditions without the dams and the federal improvements on GOL (1940 era conditions on GOL and present conditions on private land). <ul style="list-style-type: none"> Topography as per No Project Run I Channel roughness as per the Actual Harvey Run Land use as per the Actual Harvey Run 	Present urbanized conditions without the federal improvements. <ul style="list-style-type: none"> Topography as per No Project Run I Channel roughness as per the Actual Harvey Run Land use as per the Actual Harvey Run
1994 (Oct)	Urbanized conditions as per 1994 without the dams and the Federal improvements on GOL (1940 era conditions on GOL and 1994 conditions on private land). <ul style="list-style-type: none"> Topography as per 2001 Storm Run Channel roughness as per the Actual Harvey Run Land use as per 1992 NLCD 	Urbanized conditions as per 1994 without the Federal improvements. <ul style="list-style-type: none"> Topography as per 2001 Storm Run Channel roughness as per the Actual Harvey Run Land use as per 1992 NLCD
2015 (May)	As per 2016 Storm Run	As per 2016 Storm Run
2009 (Mar)	As per 2016 Storm Run	As per 2016 Storm Run

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Year of Storm	Reservoir and Upstream Status	Downstream Status
1975 (Jun)	<p>Urbanized conditions as per 1975 without the dams and the Federal improvements on GOL (1940 era conditions on GOL and 1975 conditions on private land).</p> <ul style="list-style-type: none">• Topography as per 2001 Storm Run• Channel roughness as per the Actual Harvey Run• Land use as per 1975.	<p>Urbanized conditions as per 1975 without the Federal improvements.</p> <ul style="list-style-type: none">• Topography as per 2001 Storm Run• Channel roughness as per the Actual Harvey Run• Land use as per 1975.

5.3 Model Results

5.3.1 Actual Harvey Run

The Actual Harvey Run represents the actual Harvey Event. The calibrated model predicts peak water surface elevations and their timings within the Focus Area with a high degree of certainty as demonstrated in Sections 4.5.5 and 4.6. Comparison between simulated and measured water surface elevations are presented in Figure 5.1 to Figure 5.18. Simulated water surface elevations at downstream Test Properties are presented in Figure 5.19 to Figure 5.32. Table 5.4 and Table 5.5 present summaries of the Actual Harvey Run model results for upstream and downstream Test Plaintiffs, respectively.

Our analysis shows that the federal project (Addicks and Barker Reservoirs) allows for the distribution of flooding impacts across a wide area to minimize the chance of life-threatening conditions in any one area.

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Table 5.4: Summary of the Actual Harvey Run Results at Upstream Test Plaintiffs

Plaintiff	Elevations (ft, NAVD88)					Max Depth above First Finished Floor (ft)	Flooding duration in First Finished Floor
	Lowest Grade	Garage	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Lakes on Eldridge	106.3	-	108.4	108.9	-	0.5	1 day, 9 hr
Wind, Kurt & Jean	106.9	108.6	108.2	109.2	109.3	0.2	0 day, 22 hr
Mitchell, Stewart	105.7	108.5	108.0	109.0	-	0.4	1 day, 6 hr
West Houston Airport Corp.	106.6	-	107.5	108.6		0.8	2 day, 2 hr
Mitchell, Mario	119.9	121.5	121.1	121.9	-	1.8	1 day, 13 hr
Burnham, Elizabeth	102.6	105.0	104.0	105.5	-	3.9	6 day, 19 hr
Sidhu, Kulwant	105.1	-	106.3	107.1	116.7	2.3	4 day, 12 hr
Turney, Robert	101.7	104.2	103.8	104.7	-	4.8	7 day, 18 hr
Holland, Scott	106.1	107.4	107.2	107.8	-	1.6	3 day, 10 hr
Popovici, Catherine*	99.6	101.7	100.9	102.2	-	0.6	1 day, 18 hr
Soares, Elisio	98.7	100.7	100.0	101.1	-	1.7	3 day, 15 hr
Micu, Christina	97.7	99.6	98.9	99.8	-	3.0	5 day, 22 hr
Giron, Juan & Ann	99.0	101.0	100.2	101.0	101.5	1.8	4 day, 21 hr
Banker, Todd & Christina	97.6	100.2	99.6	100.7	-	2.1	4 day, 5 hr

* This property did not actually flood above FFE. The model overestimates the water surface elevations at this property.

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Table 5.5: Summary of the Actual Harvey Run Results at Downstream Test Plaintiffs

Plaintiff	Elevations (ft, NAVD88)					Max Depth above First Finished Floor (ft)	Flooding duration in First Finished Floor
	Lowest Grade	Garage	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Aldred, Val	78.9	80.1	79.4	80.6	-	1.5	4 day, 23 hr
Good Resources, LLC	75.1	-	77.8	78.5	87.4	3.5	10 day, 8 hr
Memorial SMC Investment 2013 LP	72.4	78.2	73.5	77.2	77.3	4.8	12 day, 3 hr
Milton, Arnold & Virginia	76.3	78.6	78.0	78.5	78.6	4.0	10 day, 24 hr
Shipos, Jennifer	78.2	80.5	80.2	80.9	-	0.7	1 day, 10 hr
Hollis, Wayne & Peggy	74.5	76.7	75.2	76.6	-	3.2	9 day, 23 hr
Silverman, Peter & Zhennia	73.4	75.2	74.4	75.0	-	1.3	3 day, 3 hr
Godejord, Arnstein & Inga	68.5	73.5	72.8	73.7	-	2.0	6 day, 15 hr
Cutts, Paul & Dana	68.8	71.1	69.9	71.7	-	0.1	0 day, 14 hr
Ho, Becky (no longer a Test Plaintiff)	69.2						
Beyoglu, Gokhan & Jana	63.6	64.8	63.8	65.4	-	3.0	8 day, 12 hr
Azar, Phillip	43.6	48.1	44.8	48.9	-	8.5	11 day, 18 hr
Stahl, Timothy	55.0	55.4	55.2	52.1	55.9	2.8	0 day, 17 hr
Welling, Shawn	36.1	46.8	37.3	36.0	47.4	8.8	2 day, 11 hr

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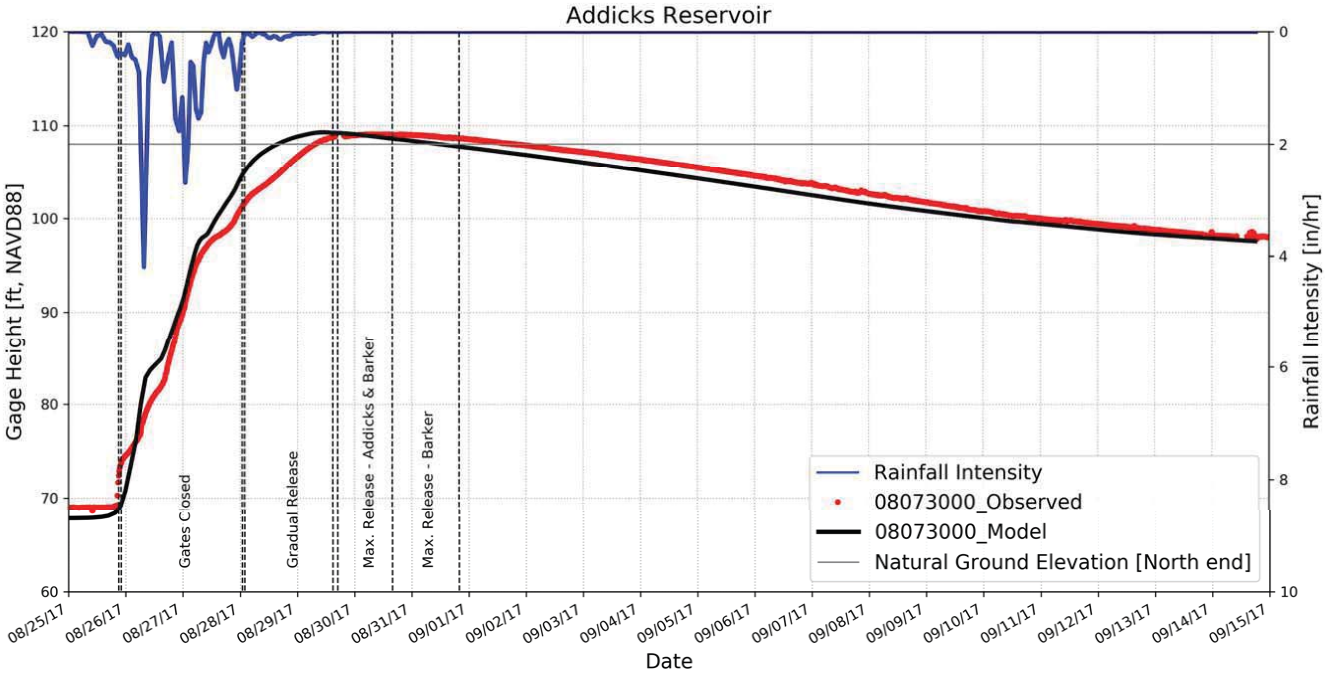


Figure 5.1: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08073000 upstream of the Addicks gates (Addicks reservoir pool elevations).

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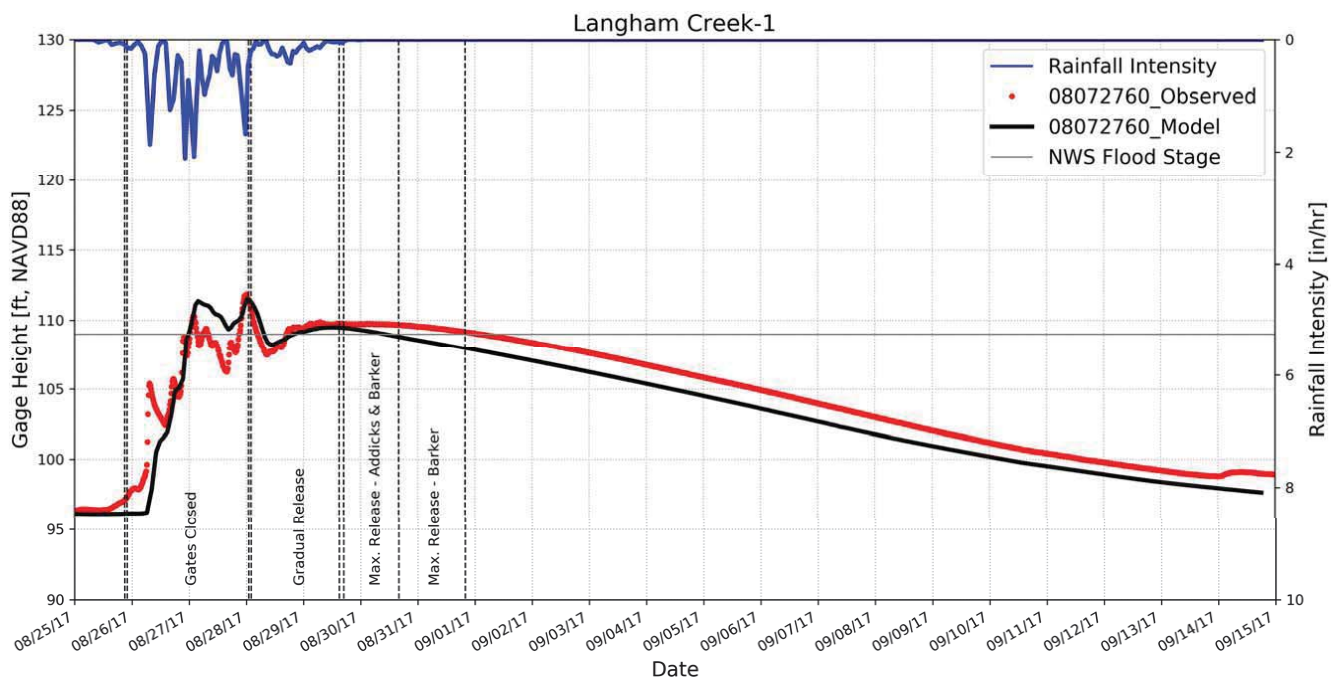


Figure 5.2: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072760 on upper Langham Creek.

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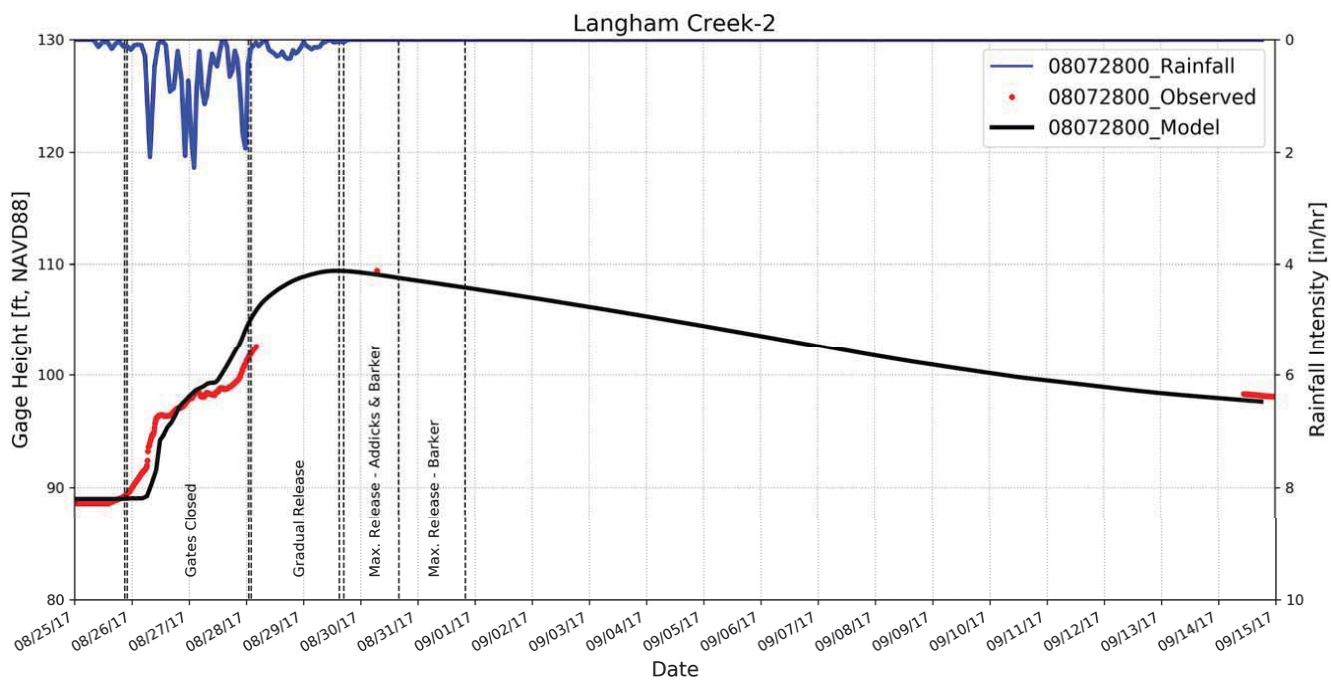


Figure 5.3: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072800 on upper Langham Creek.

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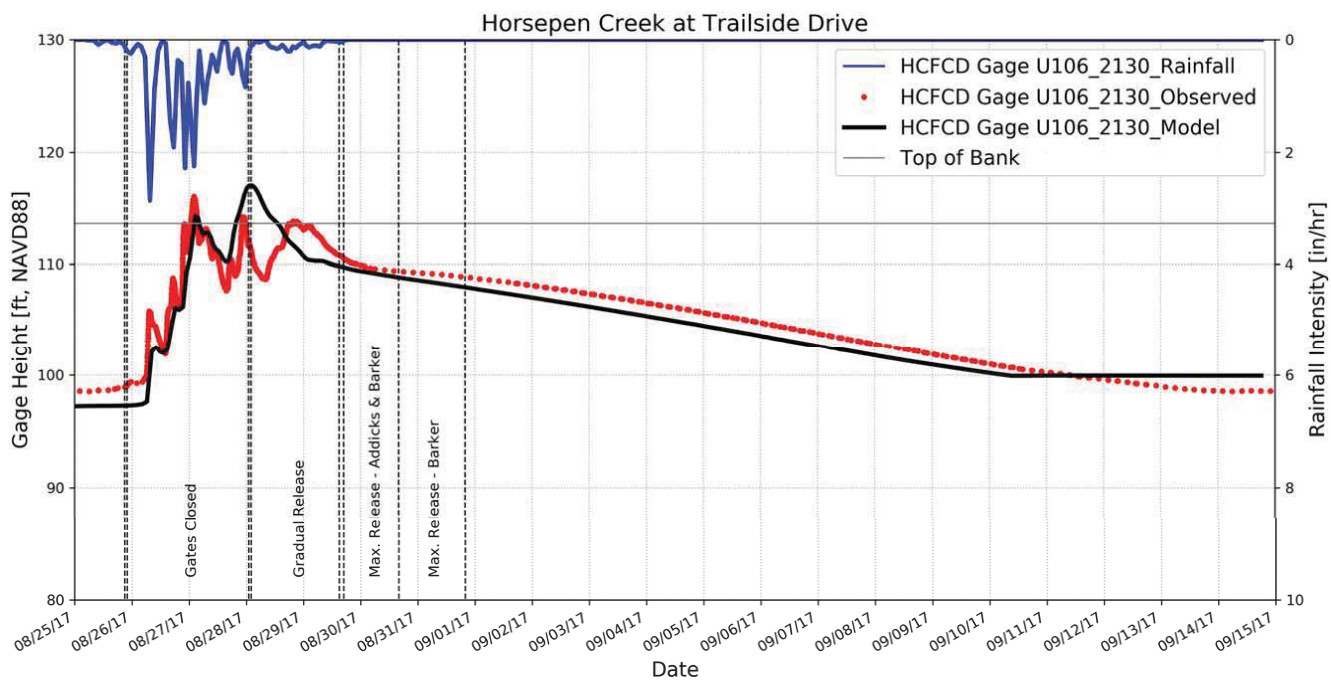


Figure 5.4: Simulated (Actual Harvey Run) and measured WSE at HCFCF Gage U106_2130 on Horsepen Creek.

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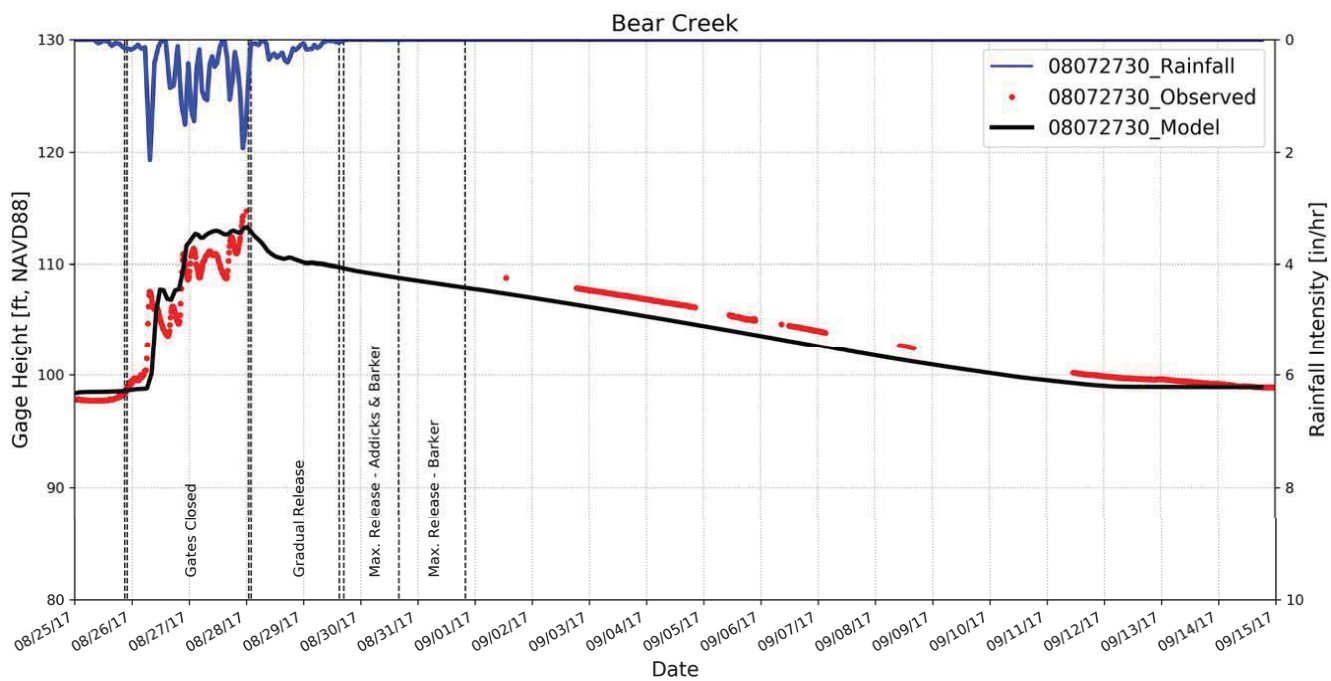


Figure 5.5: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072730 on Bear Creek.

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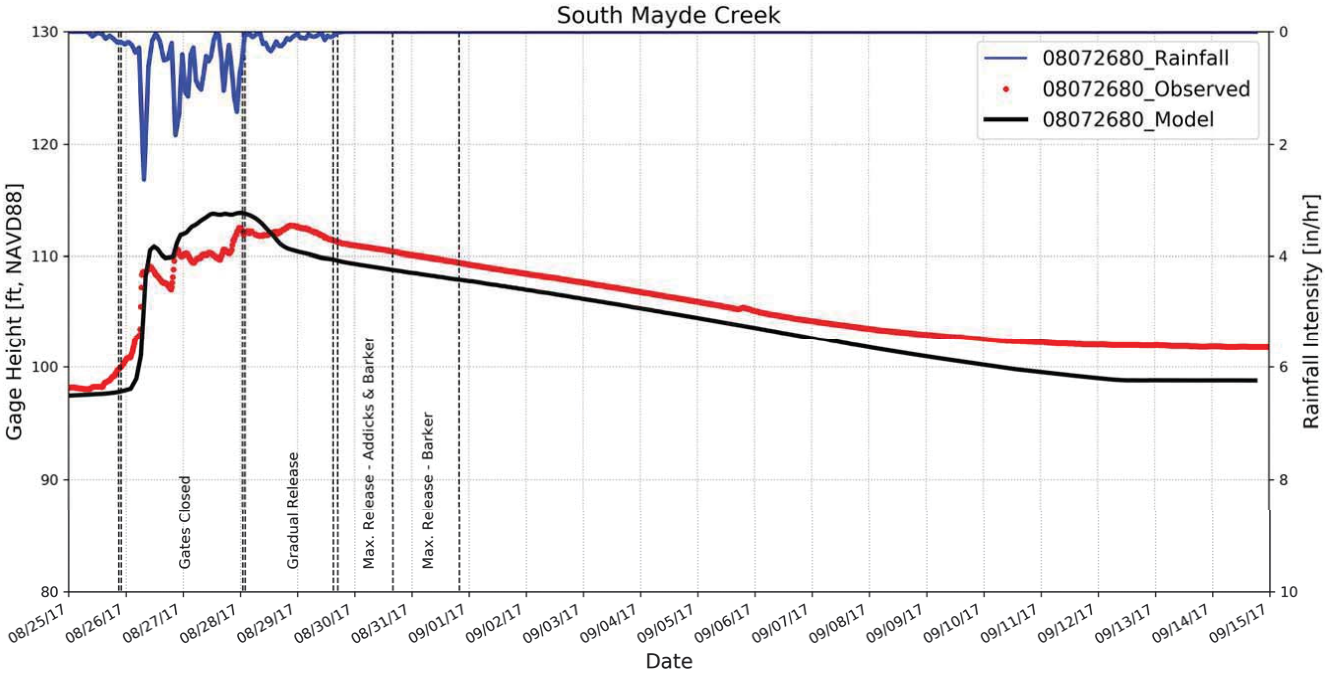


Figure 5.6: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072680 on South Mayde Creek.

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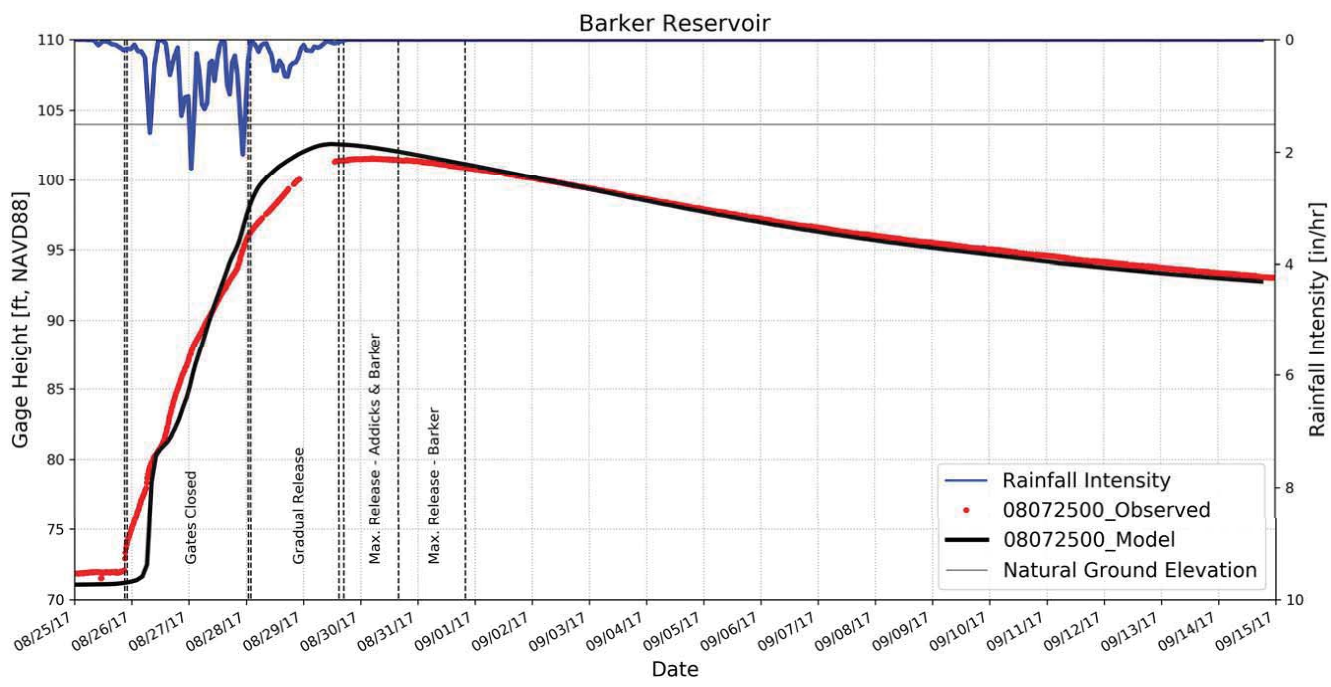


Figure 5.7: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072500 upstream of Barker gates (Barker reservoir pool elevations).

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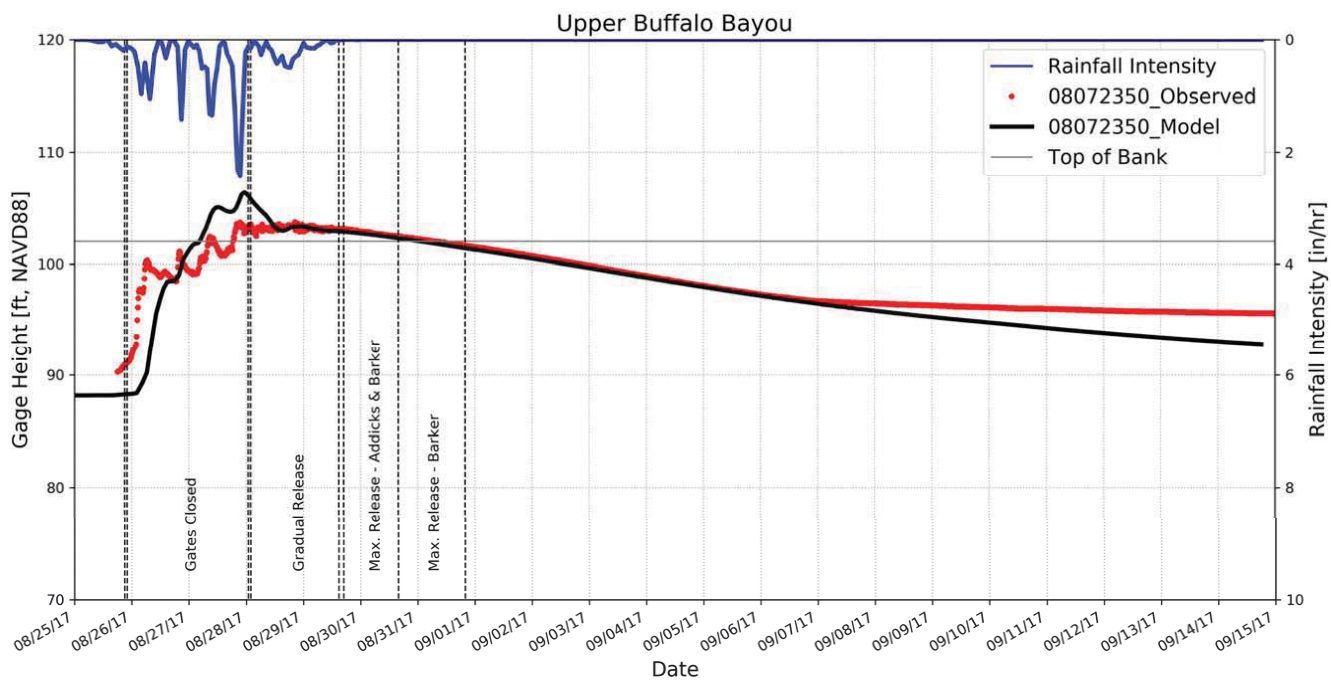


Figure 5.8: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072350 on upper Buffalo Bayou.

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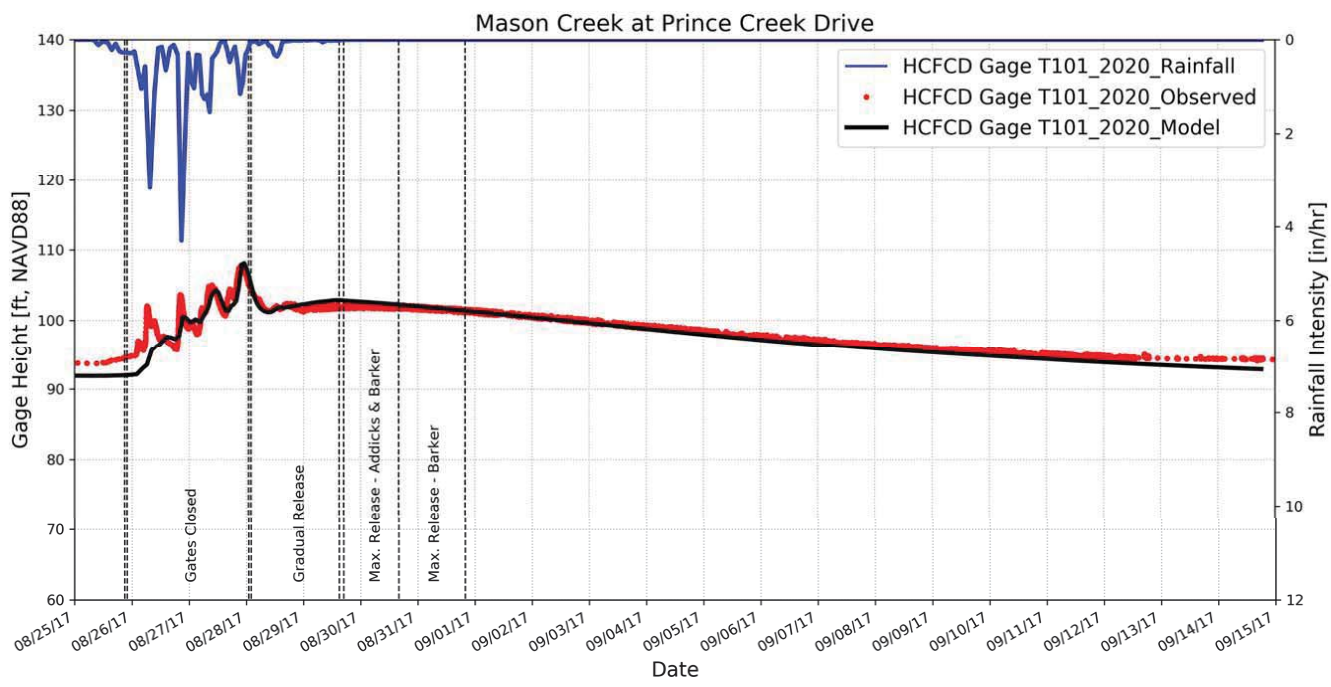


Figure 5.9: Simulated (Actual Harvey Run) and measured WSE at HCFCF Gage T101_2020 on Mason Creek.

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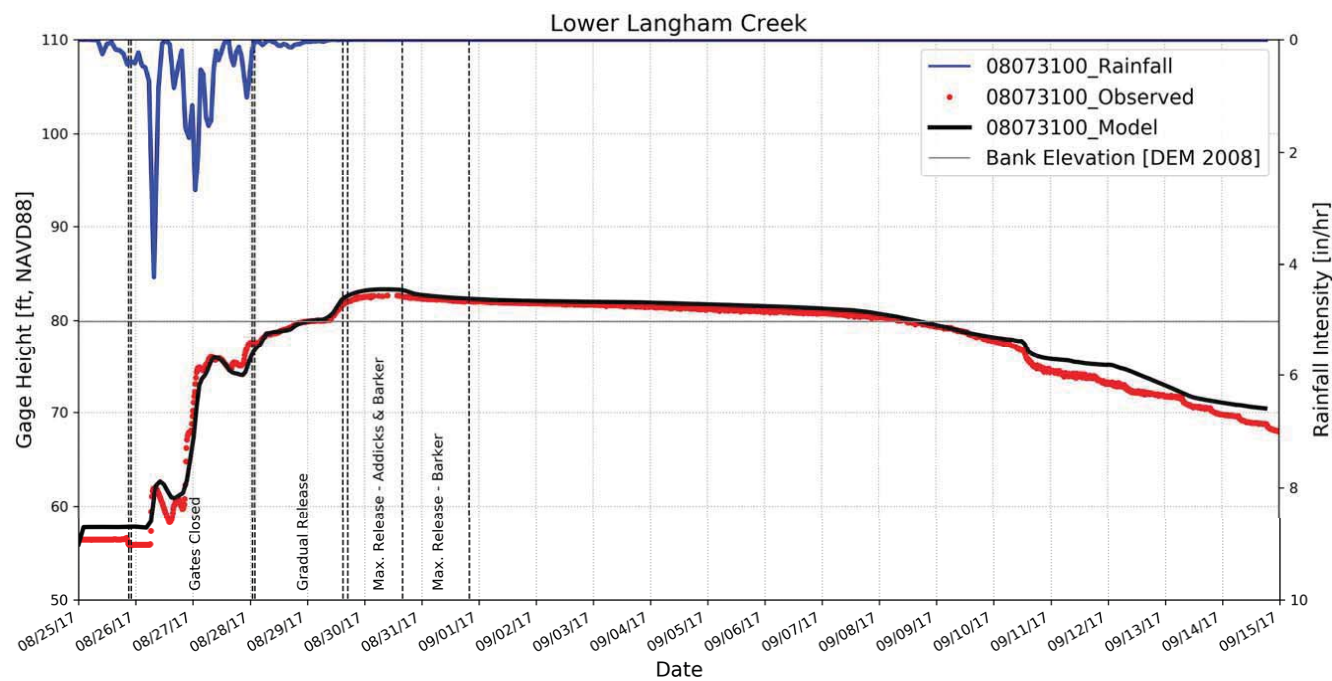


Figure 5.10: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08073100 on Lower Langham Creek.

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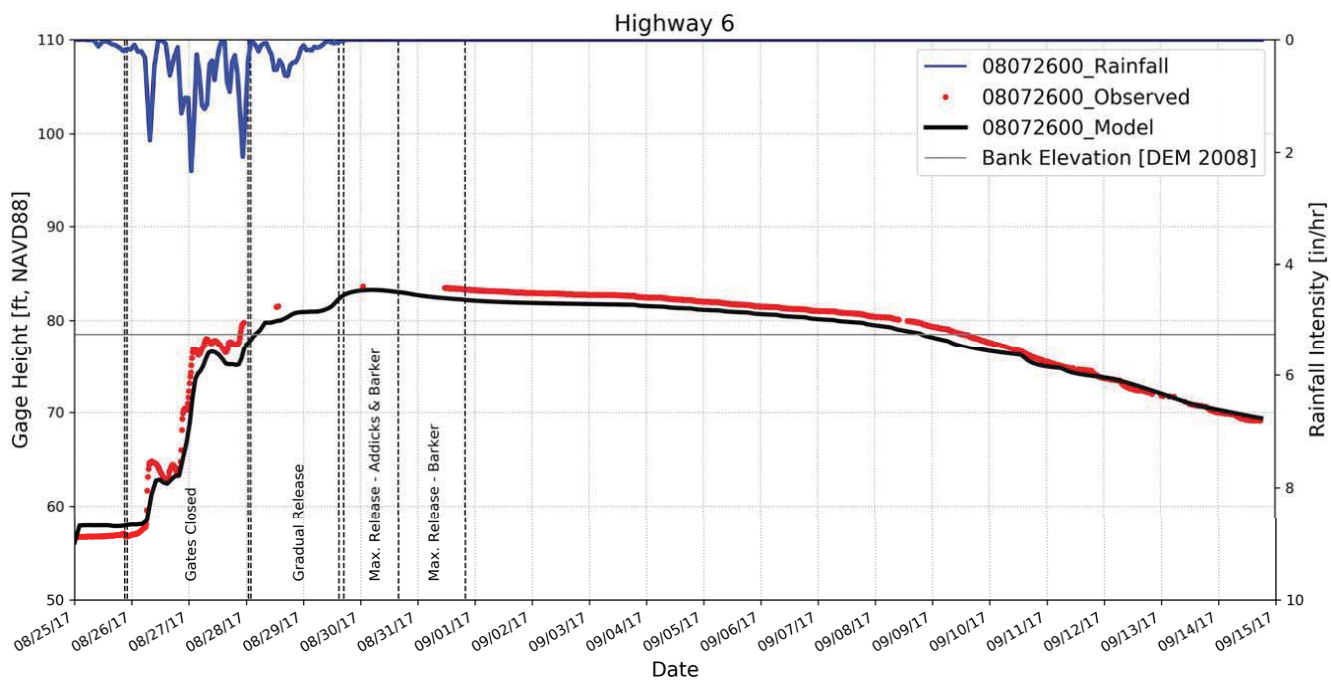


Figure 5.11: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072600 on lower Buffalo Bayou at Highway 6.

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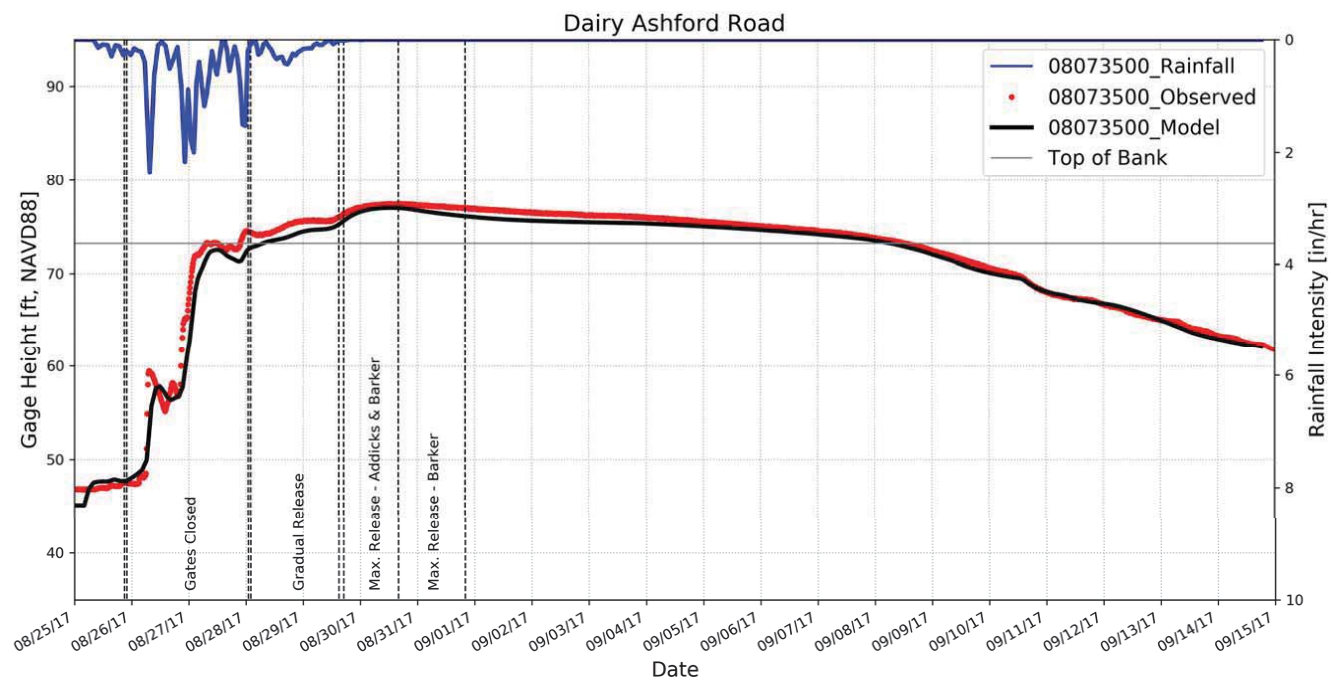


Figure 5.12: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08073500 on lower Buffalo Bayou at Dairy Ashford Road

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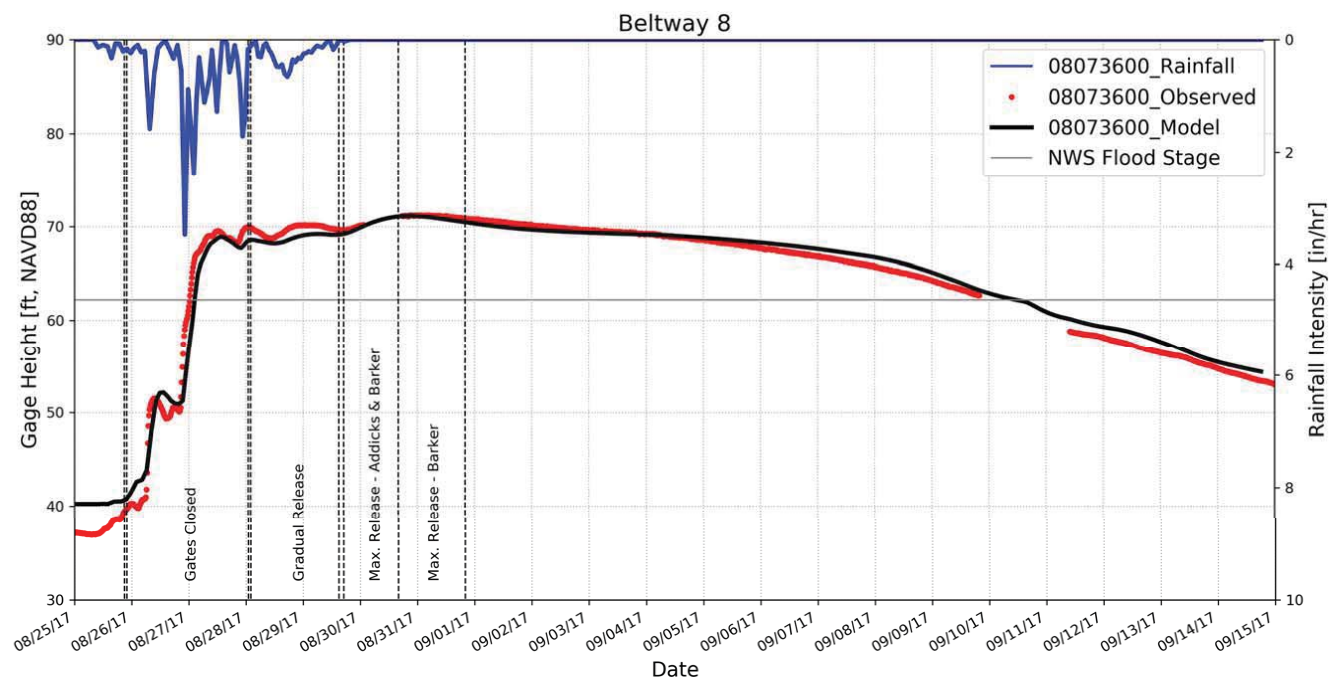


Figure 5.13: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08073600 on lower Buffalo Bayou at Beltway 8.

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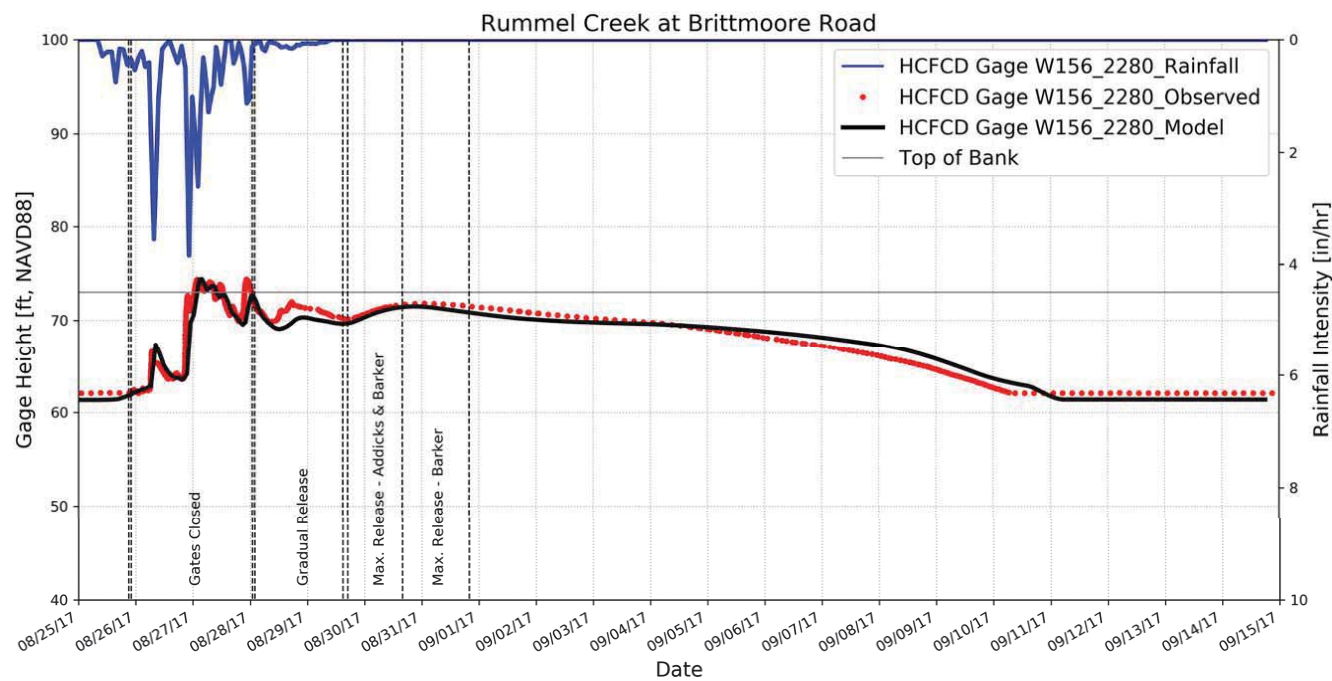


Figure 5.14: Simulated (Actual Harvey Run) and measured WSE at HCFCFCD Gage W156_2280 on Rummel Creek.

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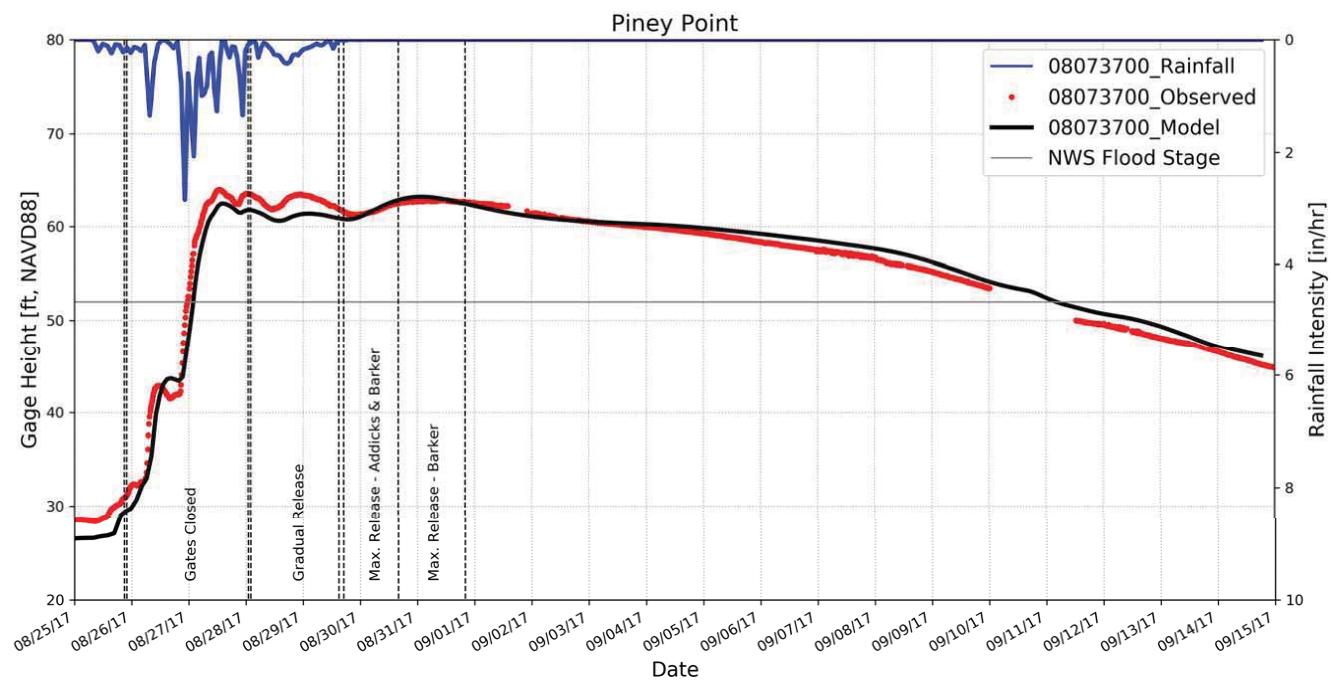


Figure 5.15: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08073700 on lower Buffalo Bayou at S Piney Point Road

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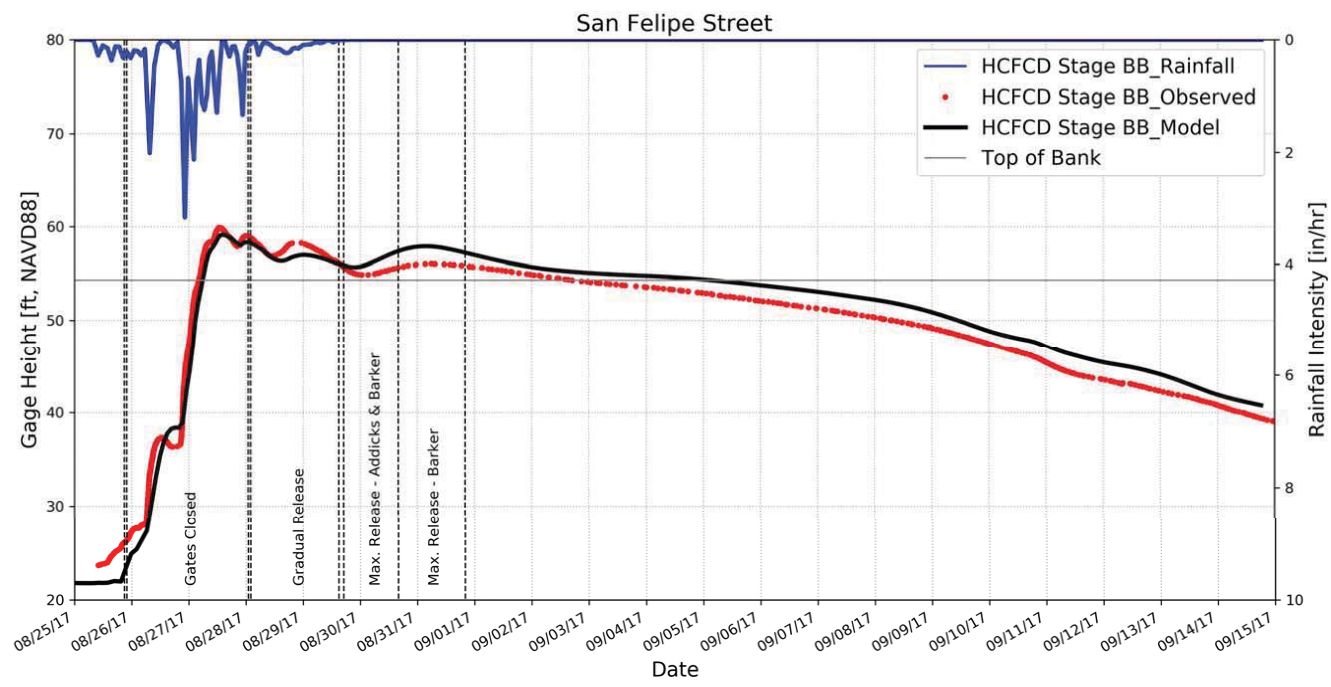


Figure 5.16: Simulated (Actual Harvey Run) and measured WSE at HCFCF Gage W100_2260 on lower Buffalo Bayou at San Felipe St.

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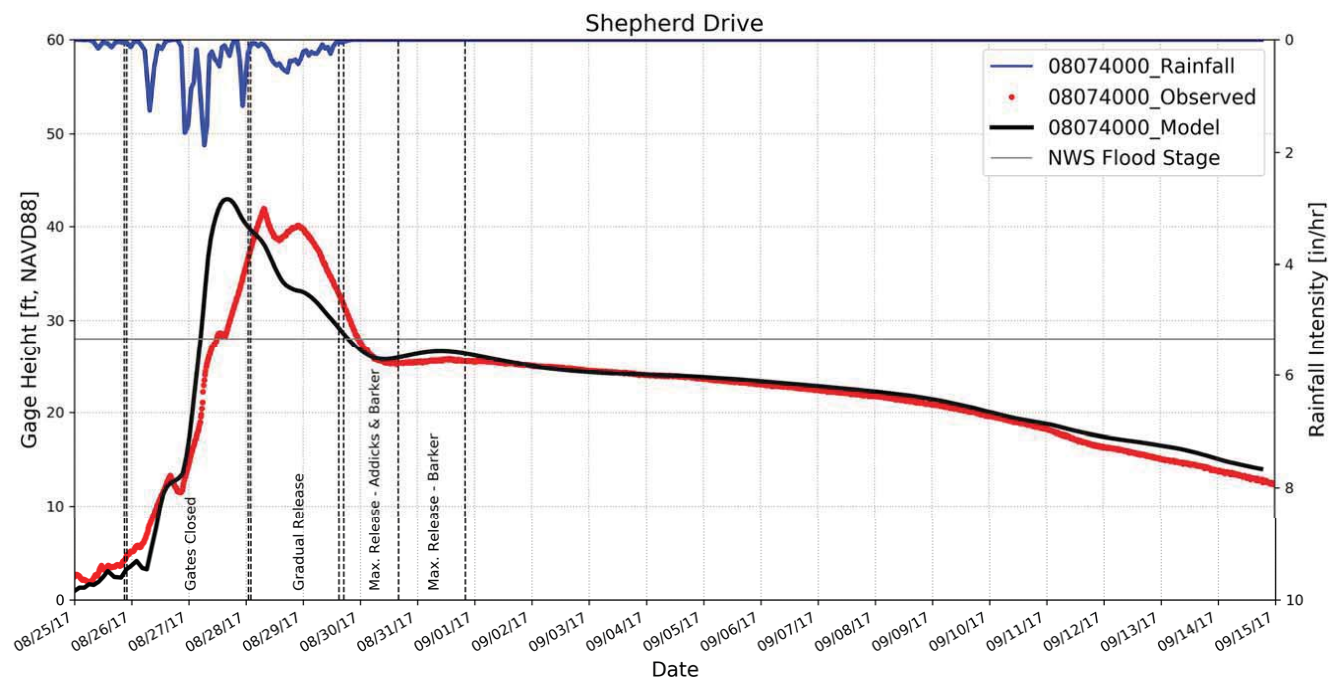


Figure 5.17: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08074000 on lower Buffalo Bayou at Shepherd Drive (gage measurements are unreliable before 8/28/2017).

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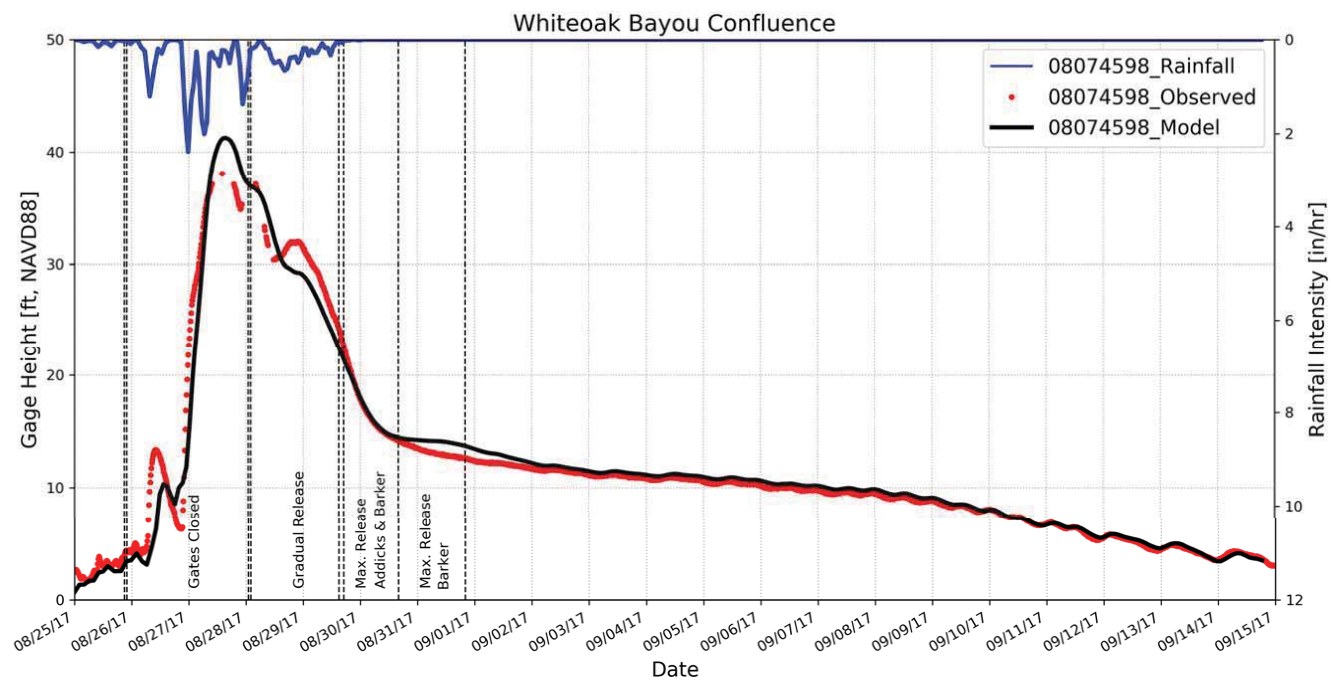


Figure 5.18: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08074598 on White Oaks Bayou at the confluence with lower Buffalo Bayou (gage is located outside the Focus Area).

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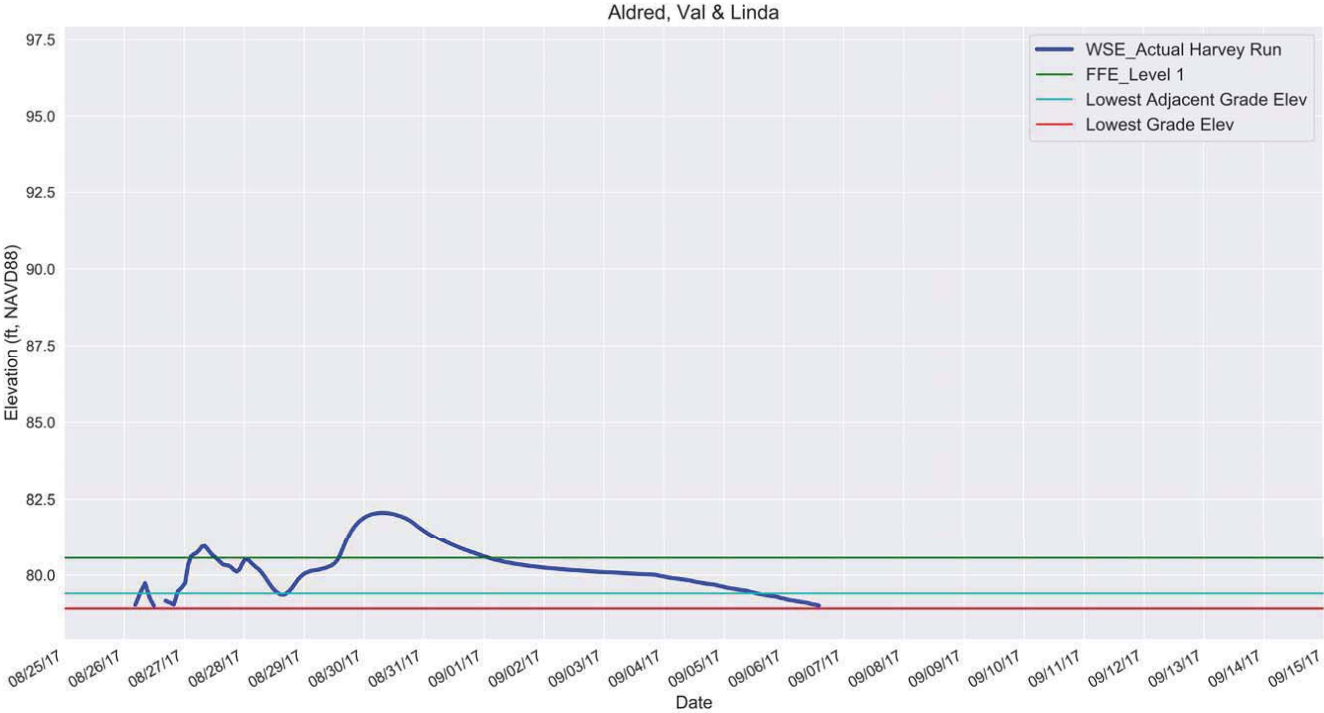


Figure 5.19: Simulated water surface elevations at the property of Aldred, Val & Linda (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
82.1	81.0	18"	12" - 18"

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Figure 5.20: Simulated water surface elevations at the property of Good Resources, LLC (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
82.0	N/A	41.5"	48" - 72"

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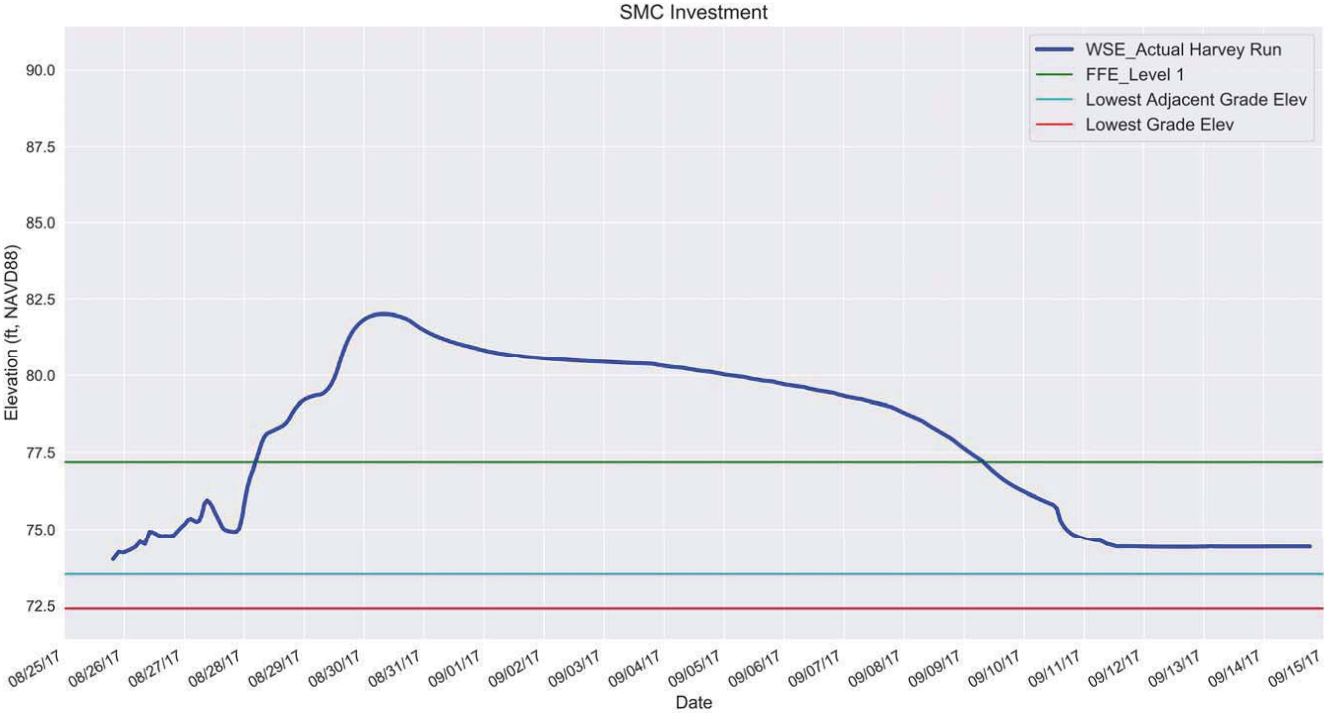


Figure 5.21: Simulated water surface elevations at the property of Memorial SMC Investment 2013 LP (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
82.0	79.2	4.8 ft	5 plus feet

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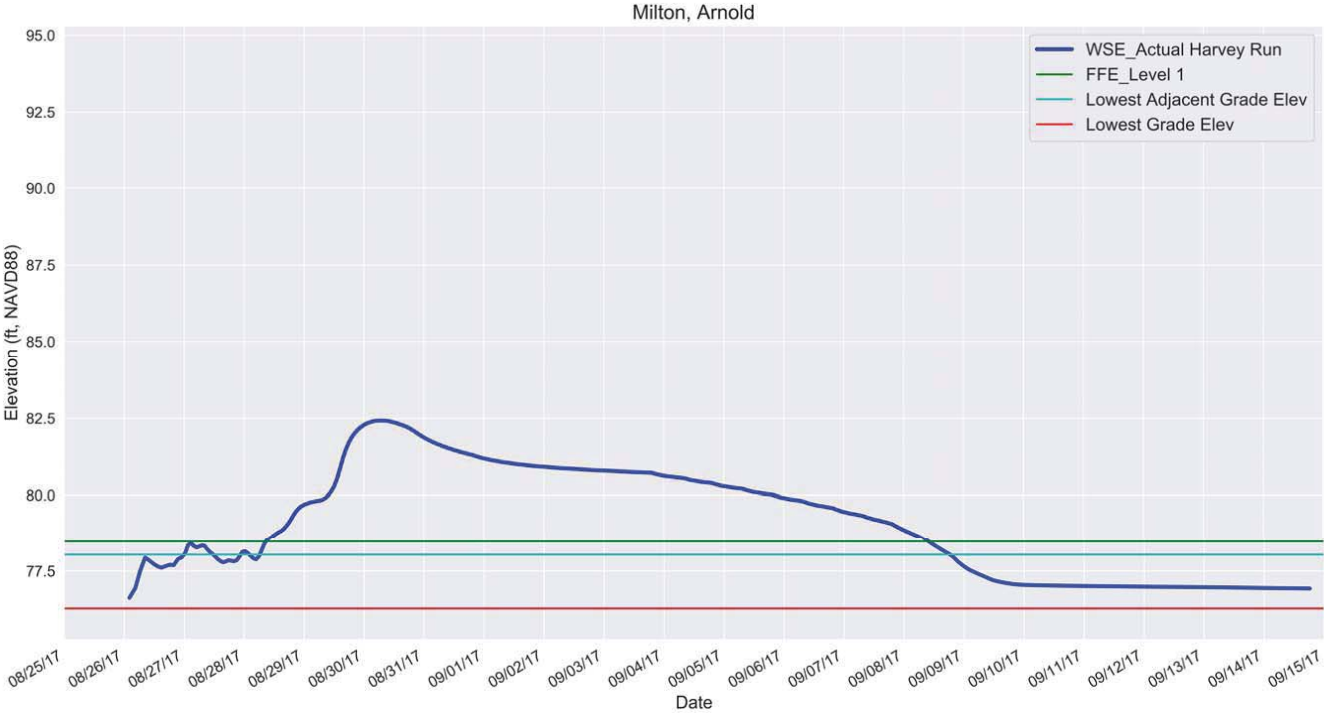


Figure 5.22: Simulated water surface elevations at the property of Milton, Arnold & Virginia (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
82.4	82.0	4 ft	4 ft to 4 ft 4 in

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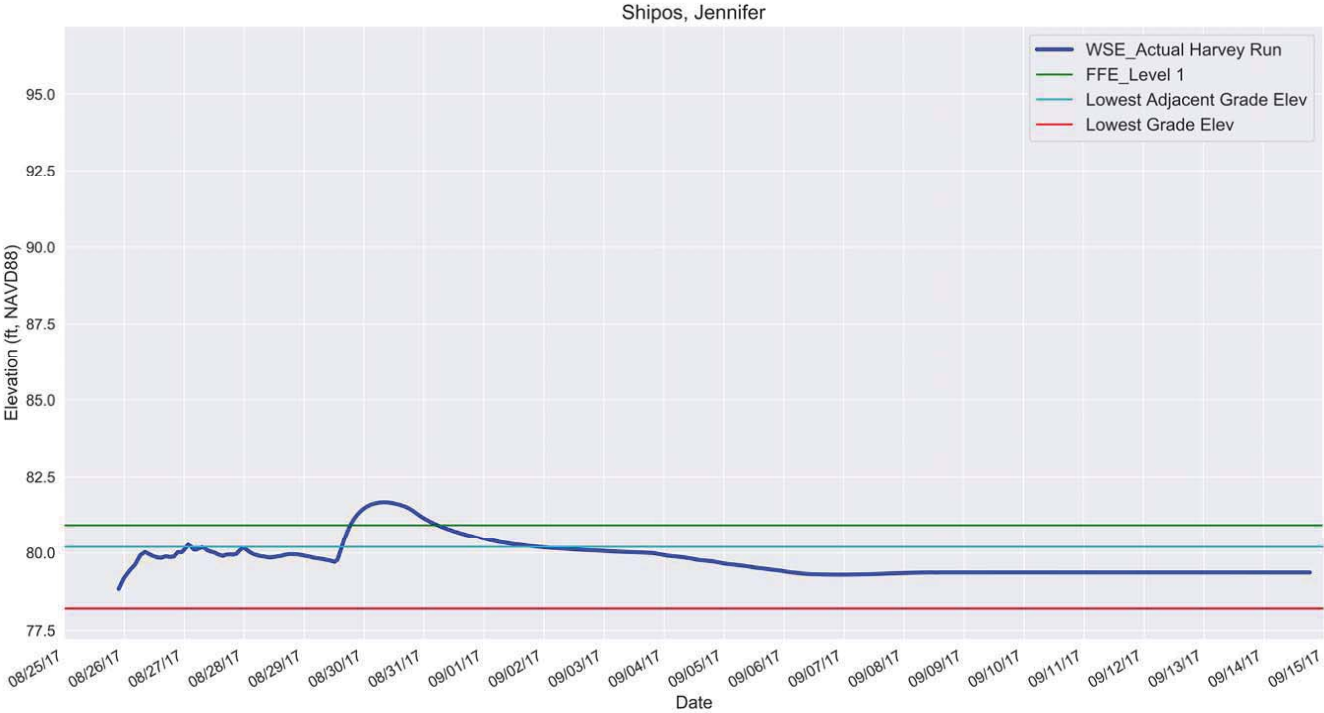


Figure 5.23: Simulated water surface elevations at the property of Shipos, Jennifer (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
81.7	N/A	9"	19" - 20" house, 24" backyard

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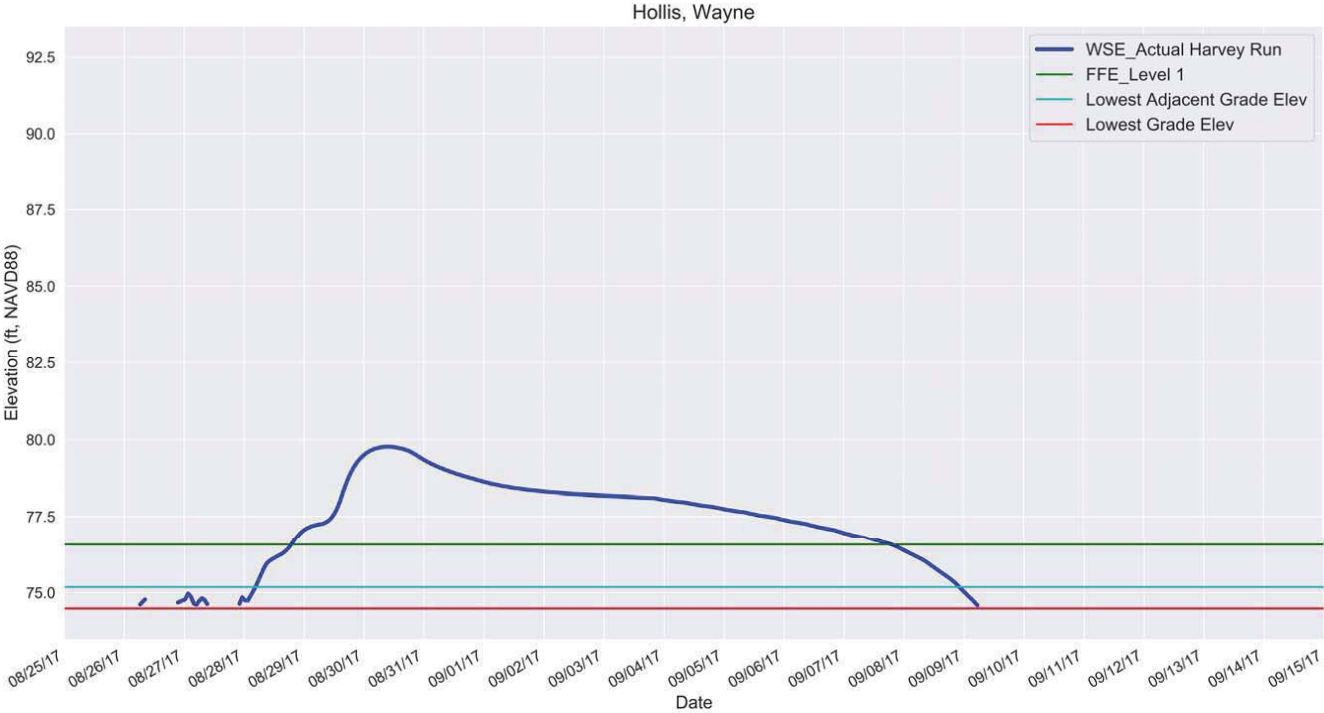


Figure 5.24: Simulated water surface elevations at the property of Hollis, Wayne & Peggy (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
79.8	78.5	38.5"	43"- 45"

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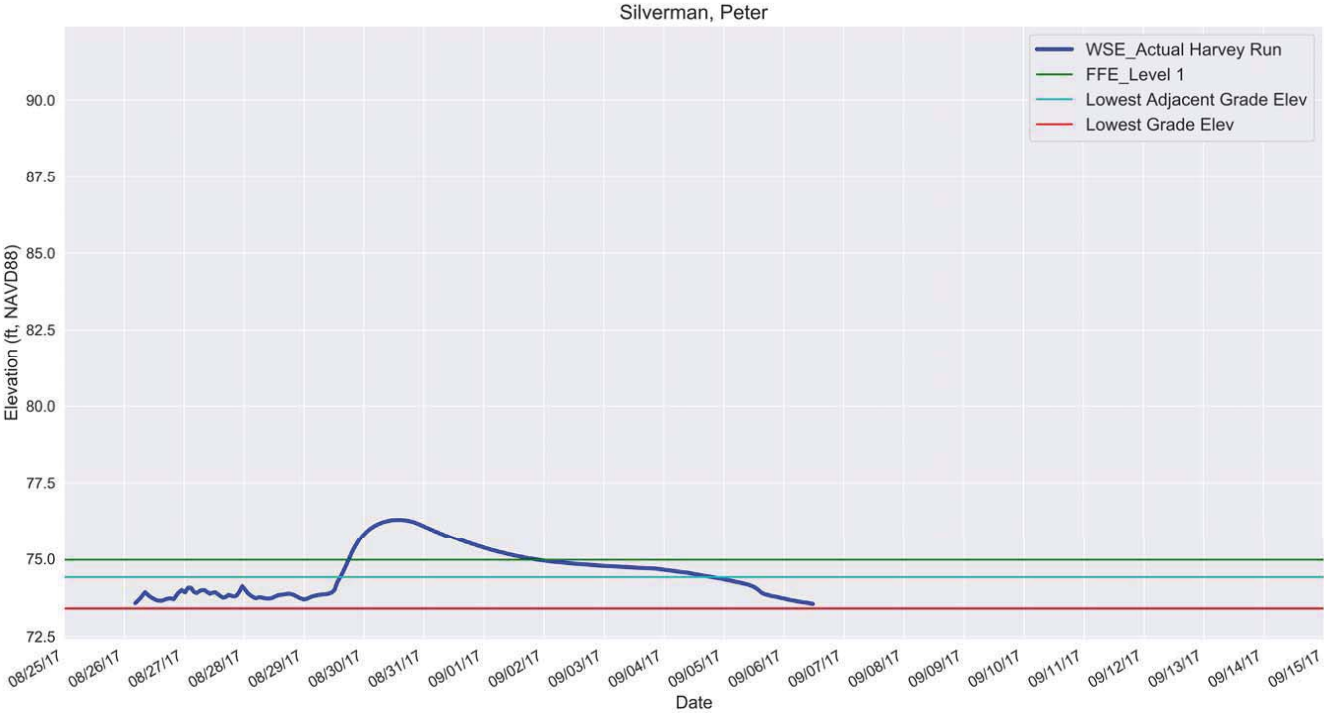


Figure 5.25: Simulated water surface elevations at the property of Silverman, Peter & Zhennia (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
76.3	76.1	16"	6" - 12" on 8/31

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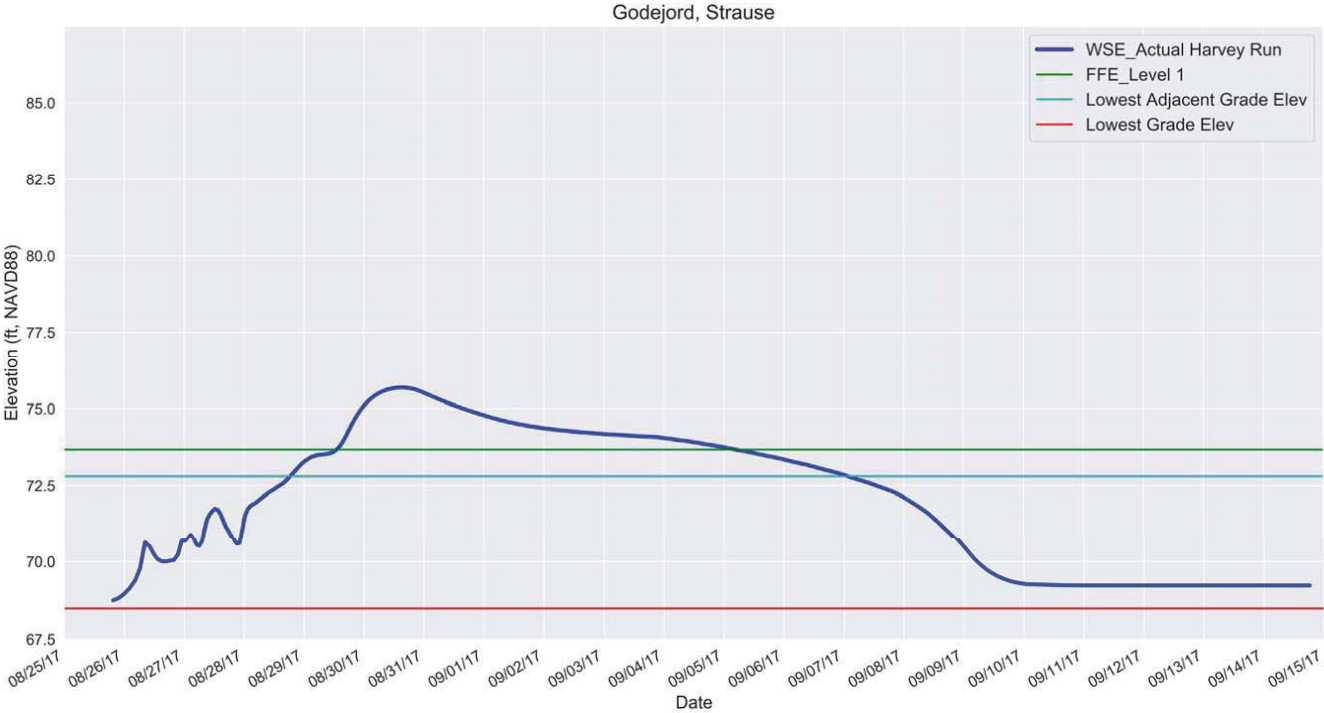


Figure 5.26: Simulated water surface elevations at the property of Godejord, Arnestien & Inga (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
75.7	N/A	2 ft	2 ft

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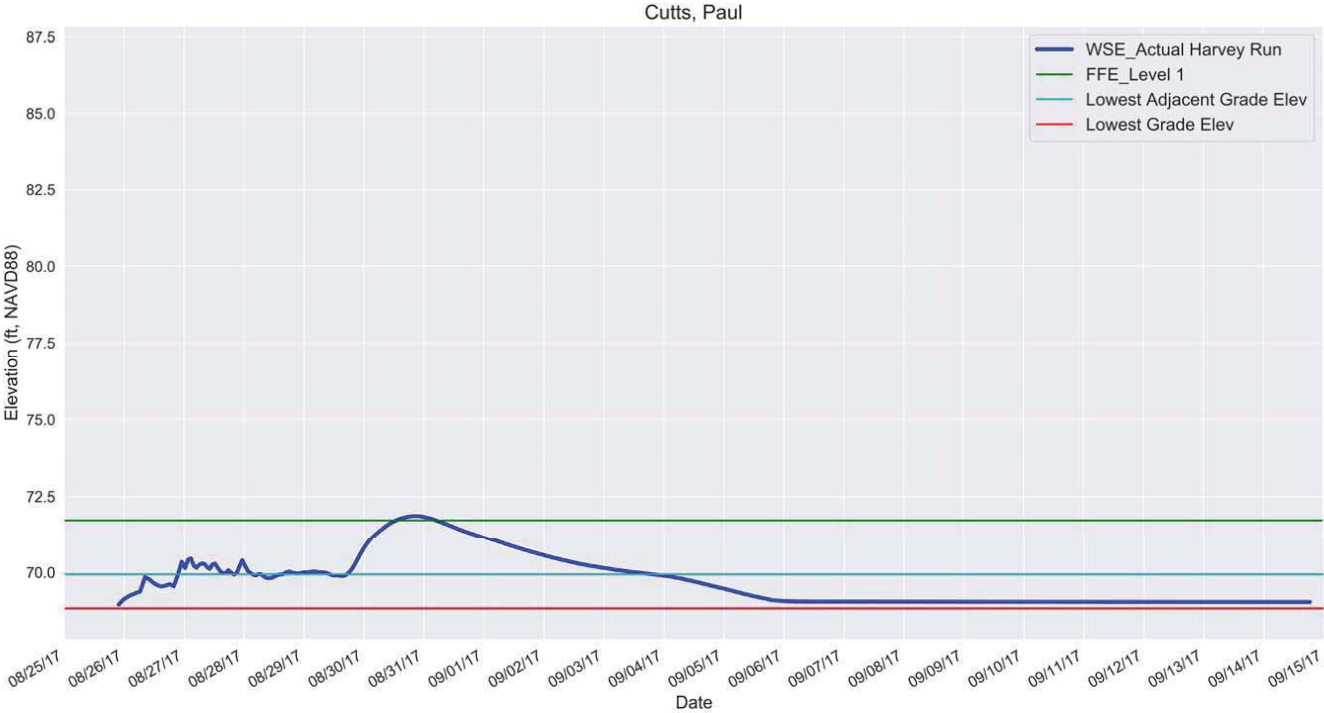


Figure 5.27: Simulated water surface elevations at the property of Cutts, Paul & Dana (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
71.9	72.7 / 72.8	1.6"	5 - 8" inside, 11-12" outside

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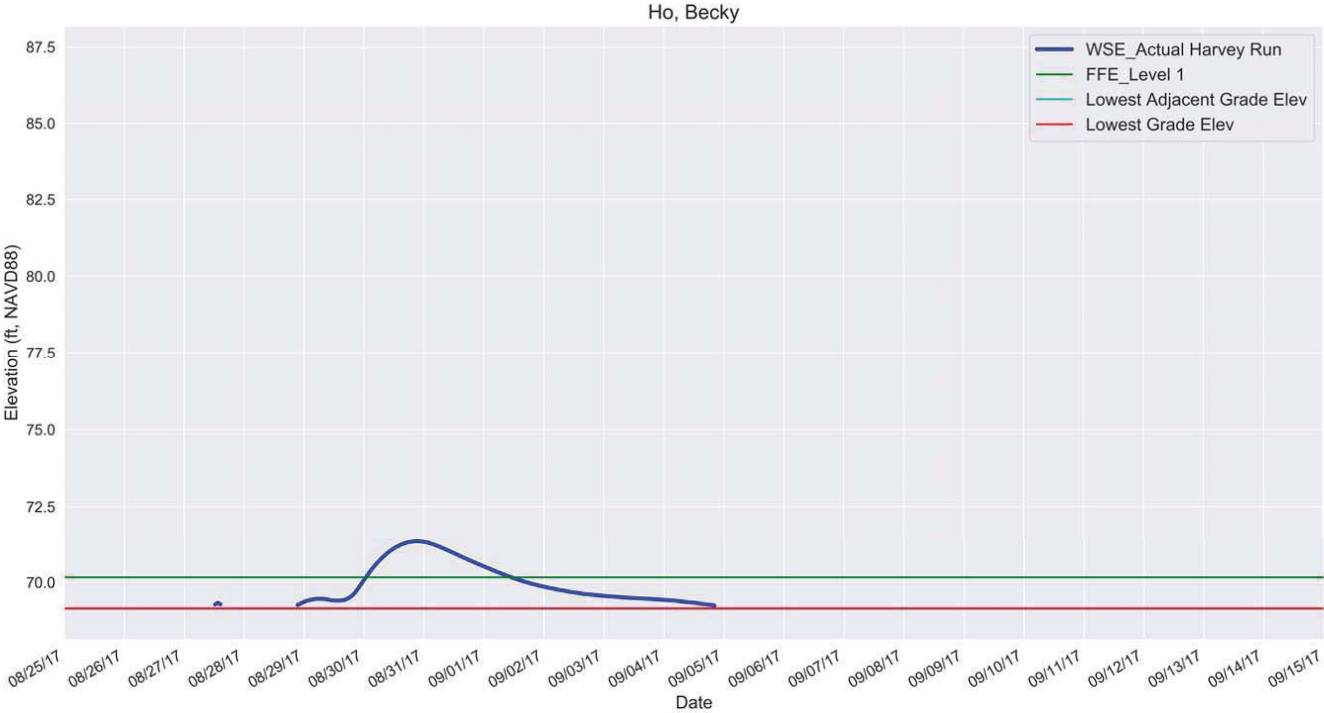


Figure 5.28: Simulated water surface elevations at the property of Ho, Becky (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
71.3	N/A	N/A	N/A

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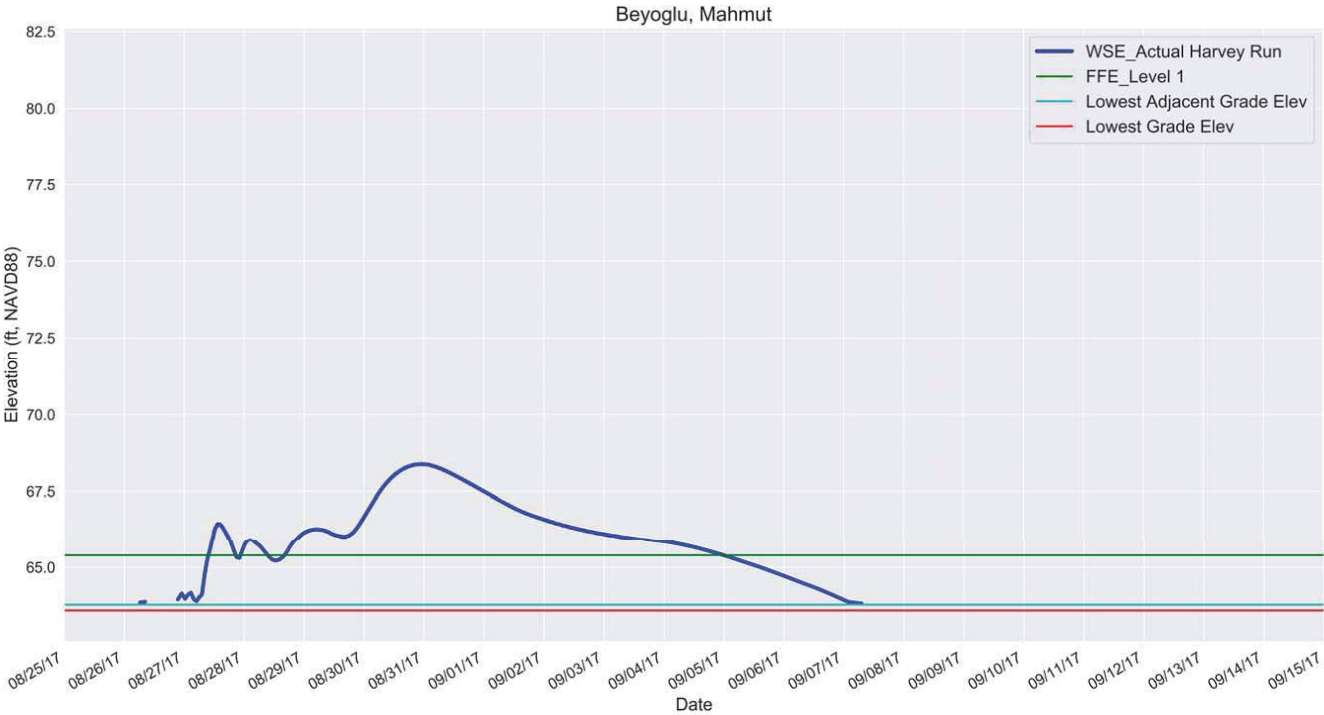


Figure 5.29: Simulated water surface elevations at the property of Beyoglu, Gokhan & Jana (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
68.4	67.1	3 ft	1.5 ft on Aug 27; peak up to 3.5 ft

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Figure 5.30: Simulated water surface elevations at the property of Azar, Philip (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
57.5	N/A	8.5	9.75 ft

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FFE at this Test Property is lower than the ground elevation. Because our model simulates surface water flows, simulated flood duration at this Test Property is only for two very brief periods of time when simulated WSE was above the ground elevation.

Figure 5.31: Simulated water surface elevations at the property of Stahl, Timothy (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
54.9	N/A	2.8	3.5 - 4 ft in lower level.

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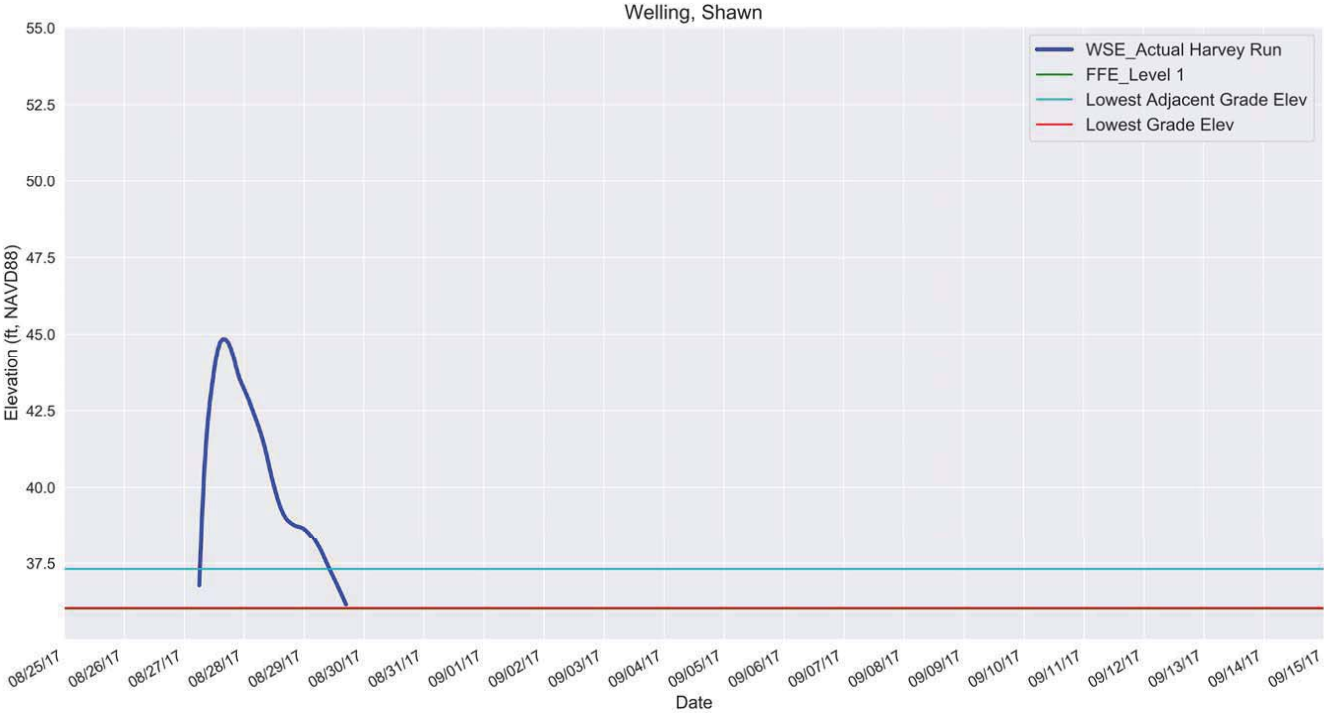


Figure 5.32: Simulated water surface elevations at the property of Welling, Shawn (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
44.8	N/A	8.8 ft	> 6 ft in basement

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5.3.2 No Project I Run

The No Project I Run simulates the Harvey Event under the assumption that the federal project on Government Owned Land is not in place. To prepare the topography for this run, the following changes to the Actual Harvey Run topography were made:

- Addicks and Barker Dams were removed
- Borrow areas⁴⁷ inside the reservoirs were filled to natural elevations
- Channels on GOL were filled to natural elevations within the GOL
- The rectified sections of lower Buffalo Bayou and lower Langham Creek below the dams were filled to natural elevations.
- The 1940s era un-rectified conditions for lower Buffalo Bayou and lower Langham Creek were re-introduced.
- Upper tributaries were connected to lower tributaries representing conditions prior to the construction of the dams and reservoirs.

Roughness and hydrologic loss parameters (derived from land use) were copied from the Actual Harvey Run. Table 5.6 and Table 5.7 present summaries of the No Project Run results extracted at upstream and downstream Test Plaintiffs, respectively. Figure 5.33 to Figure 5.50 show simulated free water surface elevations at the Test Properties comparing the No Project I Run and the Actual Harvey Run. These figures provide a measure of the benefit of the federal project⁴⁸ on flood levels. Downstream of the dams (Figure 5.37 to Figure 5.50), the increase in simulated water surface elevations for the No Project Run (compared to the Actual Harvey Run) at downstream Test Properties is as high as 8.6 feet. In addition, water depth above first finished floor elevations downstream of the dams reached more than 10 to 15 feet under the No Project I Run, which is substantially higher than depths experienced during the Harvey Event. These results show that the federal project has distributed the flooding across the upstream and downstream areas to achieve less severe conditions reducing risk to life and property. Downstream of the dams, the federal project (particularly the Addicks and Barker Dams) have distributed the amount of floodwater produced over the few-days duration of the Harvey Event over a much longer period (few weeks), which has effectively and significantly reduced the depth of floodwaters in the downstream areas.

A tabular comparison of the Actual Harvey Run and the No Project I Run is presented in Table 5.10.

⁴⁷ Borrow areas are those where material are dug for use at another location.

⁴⁸ Including the Addicks and Barker dam project, the lower Buffalo Bayou rectification project and all other federal-approved channel improvements.

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Table 5.6: Summary of the No Project I Run Results at Upstream Test Plaintiffs.

Plaintiff	Elevations (ft, NAVD88)					Max Depth above First Finished Floor (ft)	Flooding duration in First Finished Floor
	Lowest Grade	Garage	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Mitchell, Mario	119.9	121.5	121.1	121.9	-	1.8	1 day, 15 hr
Burnham, Elizabeth	102.6	105.0	104.0	105.5	-	1.1	1 day, 7 hr
Micu, Christina	97.7	99.6	98.9	99.8	-	0.9	0 day, 18 hr
Giron, Juan & Ann	99.0	101.0	100.2	101.0	101.5	1.4	0 day, 21 hr
<i>Other Upstream Test Plaintiffs do not experience flooding under the No Project I Run.</i>							

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Table 5.7: Summary of the No Project I Run Results at Downstream Test Plaintiffs

Plaintiff	Elevations (ft, NAVD88)					Max Depth above First Finished Floor (ft)	Flooding duration above First Finished Floor
	Lowest Grade	Garage	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Aldred, Val & Linda	78.9	80.1	79.4	80.6	-	9.8	4 day, 9 hr
Good Resources, LLC	75.1	-	77.8	78.5	87.4	12.0	5 day, 6 hr
Memorial SMC Investment 2013 LP	72.4	78.2	73.5	77.2	77.3	13.5	6 day, 9 hr
Milton, Arnold & Virginia	76.3	78.6	78.0	78.5	78.6	12.5	5 day, 19 hr
Shipos, Jennifer	78.2	80.5	80.2	80.9	-	9.4	4 day, 7 hr
Hollis, Wayne & Peggy	74.5	76.7	75.2	76.6	-	11.5	5 day, 6 hr
Silverman, Peter & Zhennia	73.4	75.2	74.4	75.0	-	9.3	4 day, 19 hr
Godejord, Arnestein & Inga	68.5	73.5	72.8	73.7	-	10.0	4 day, 20 hr
Cutts, Paul & Dana	68.8	71.1	69.9	71.7	-	7.6	4 day, 3 hr
Ho, Becky (no longer a Test Plaintiff)	69.2*						
Beyoglu, Gokhan & Jana	63.6	64.8	63.8	65.4	-	10.8	4 day, 6 hr
Azar, Phillip	43.6	48.1	44.8	48.9	-	16.4	4 day, 20 hr
Stahl, Timothy	55.0	55.4	55.2	52.1	55.9	10.4	4 day, 9 hr
Welling, Shawn	36.1	46.8	37.3	36.0	47.4	15.4	5 day, 7 hr

* Not surveyed; based on DEM.

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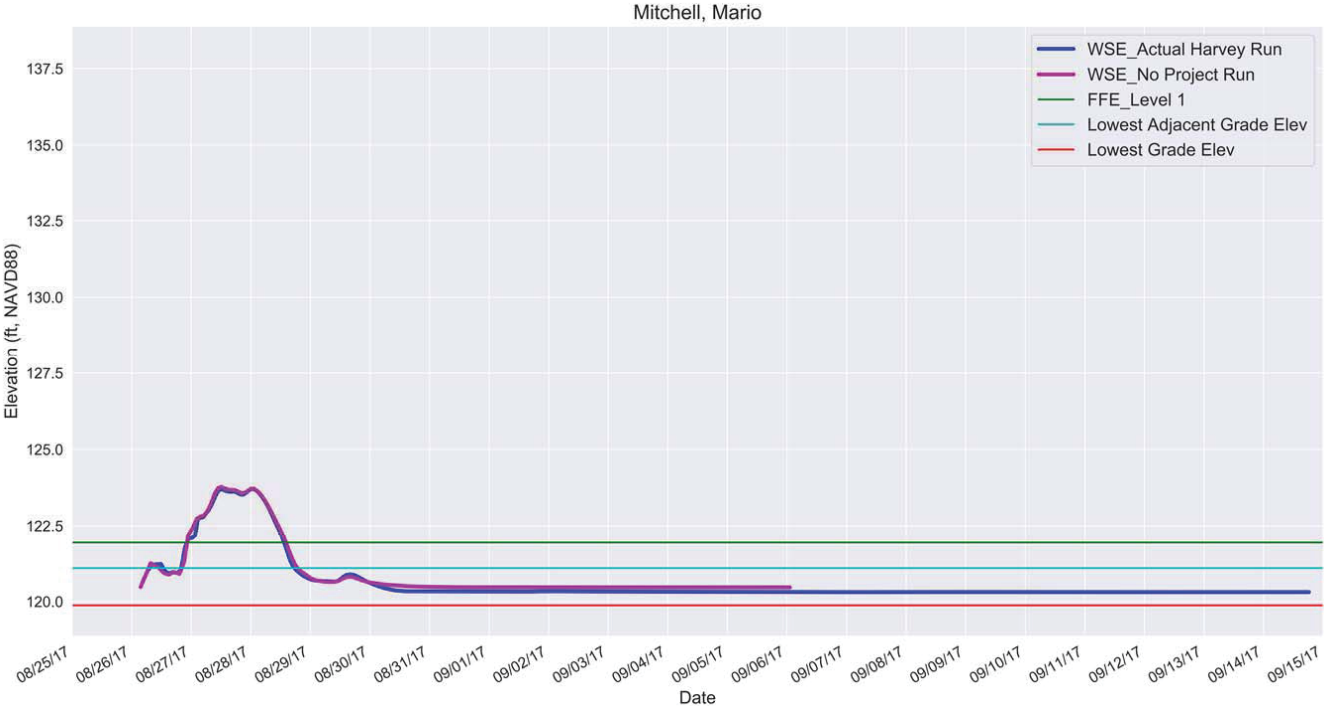


Figure 5.33: Simulated free water surface elevations at the upstream property of Mitchell, Mario (Actual Harvey Run and No Project I Run)

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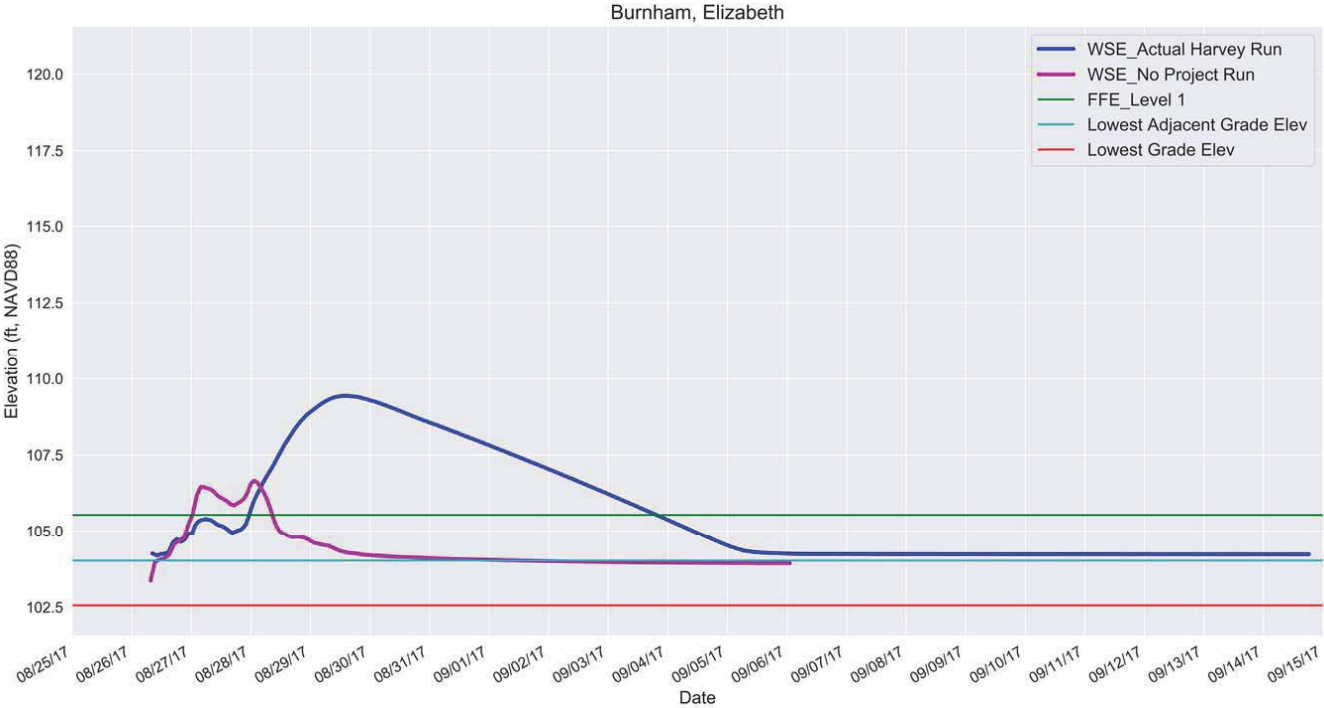


Figure 5.34: Simulated free water surface elevations at the upstream property of Burnham, Elizabeth (Actual Harvey Run and No Project I Run)

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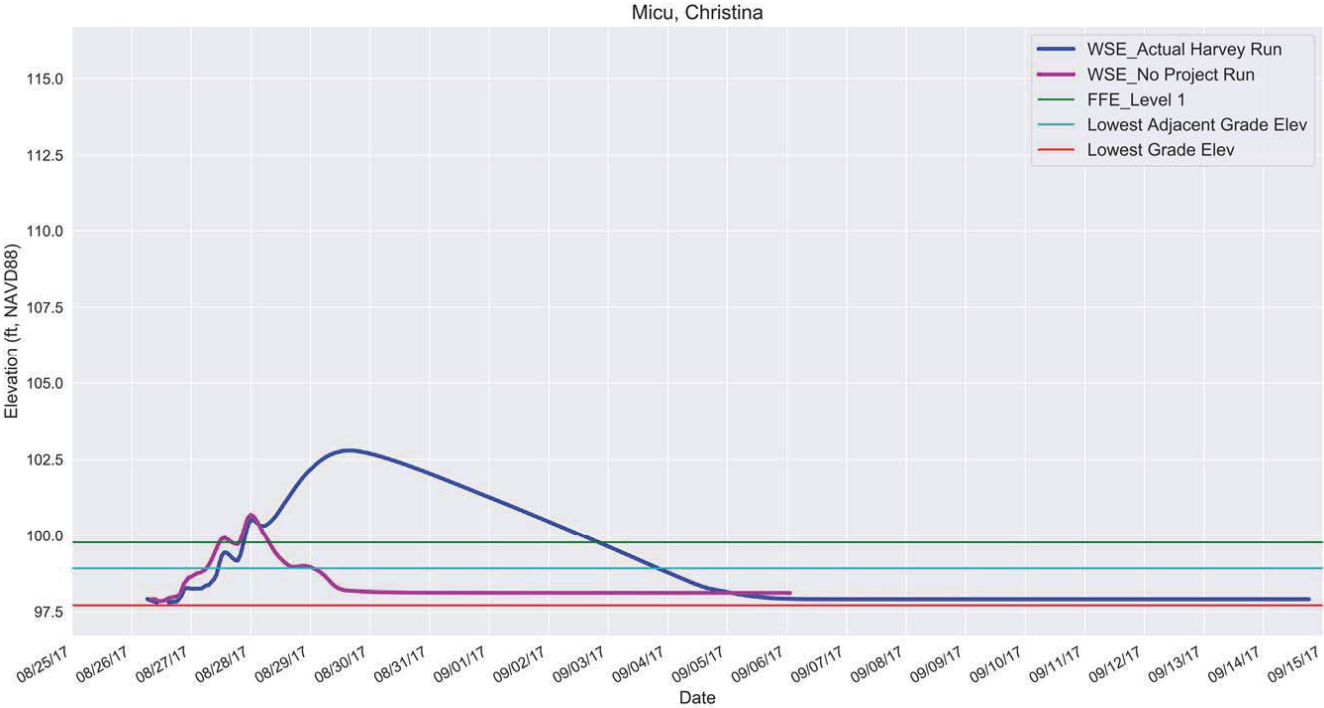


Figure 5.35: Simulated free water surface elevations at the upstream property of Micu, Christina (Actual Harvey Run and No Project I Run)

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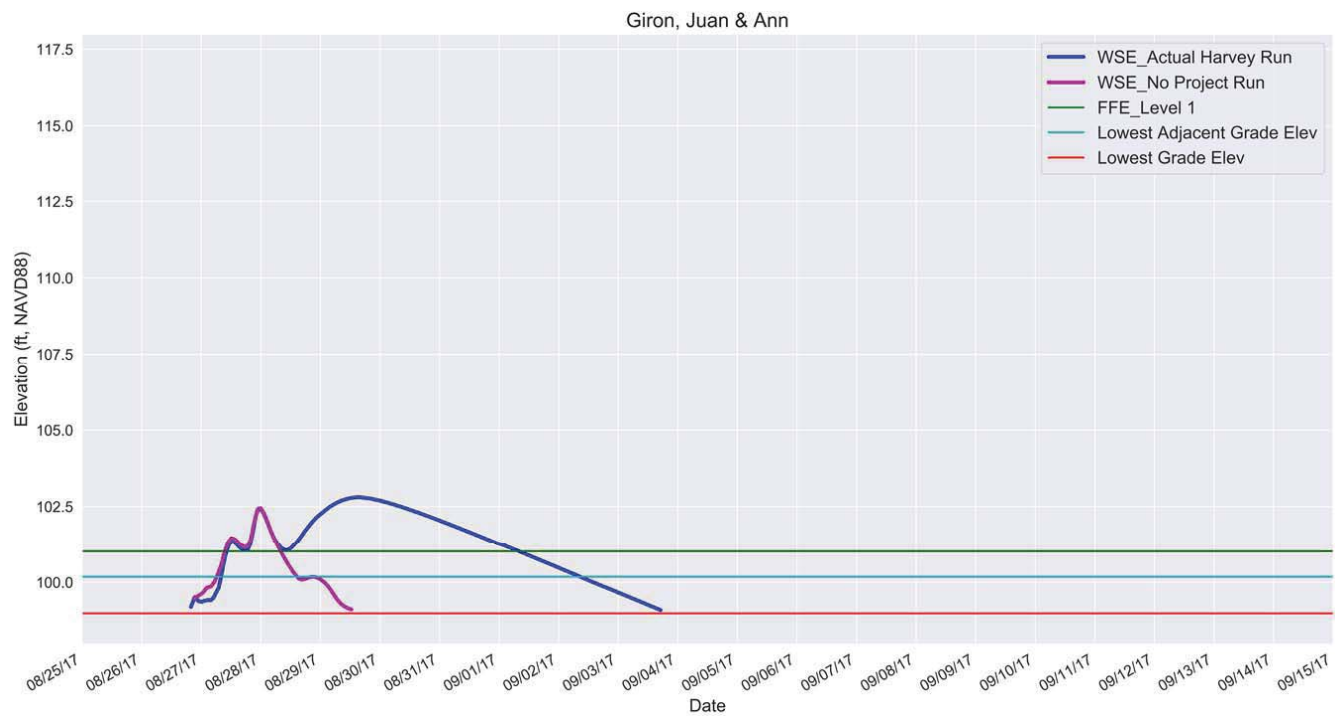


Figure 5.36: Simulated free water surface elevations at the upstream property of Giron, Juan & Ann (Actual Harvey Run and No Project I Run)

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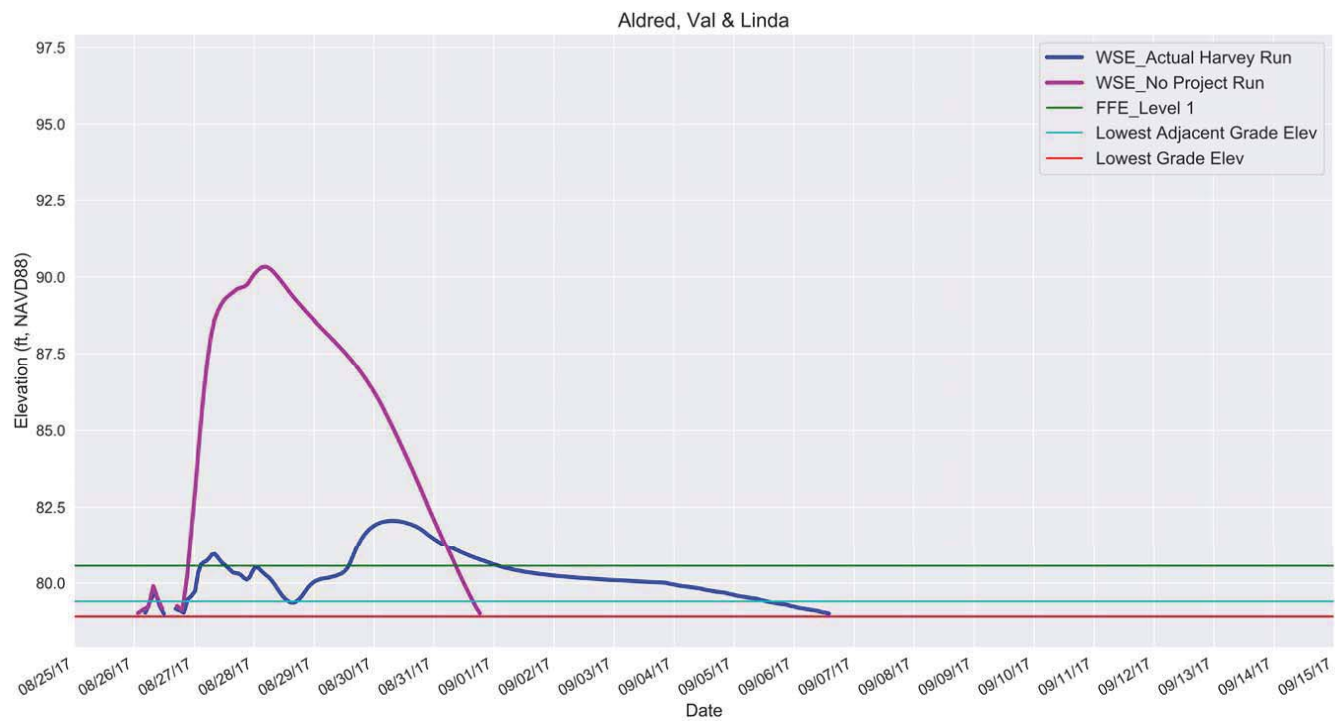


Figure 5.37: Simulated free water surface elevations at the property of Aldred, Val & Linda (Actual Harvey Run and No Project I Run)

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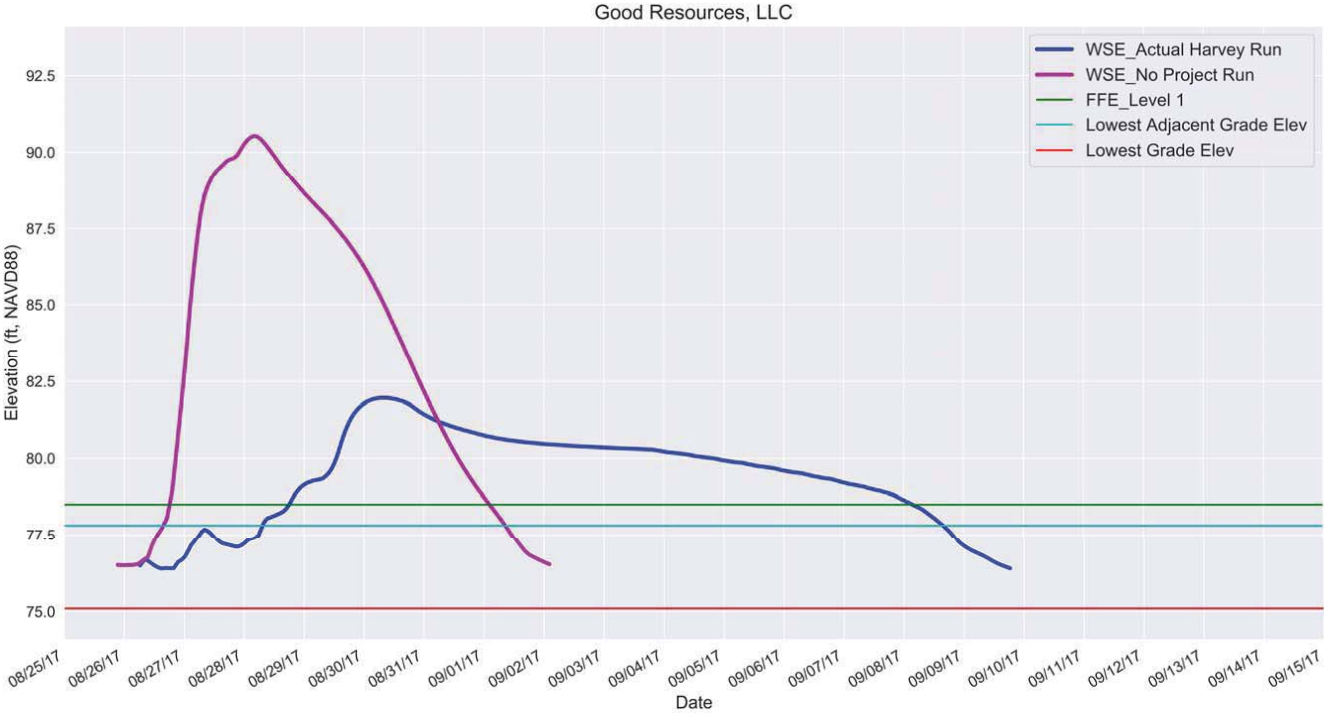


Figure 5.38: Simulated free water surface elevations at the property of Good Resources, LLC (Actual Harvey Run and No Project I Run)

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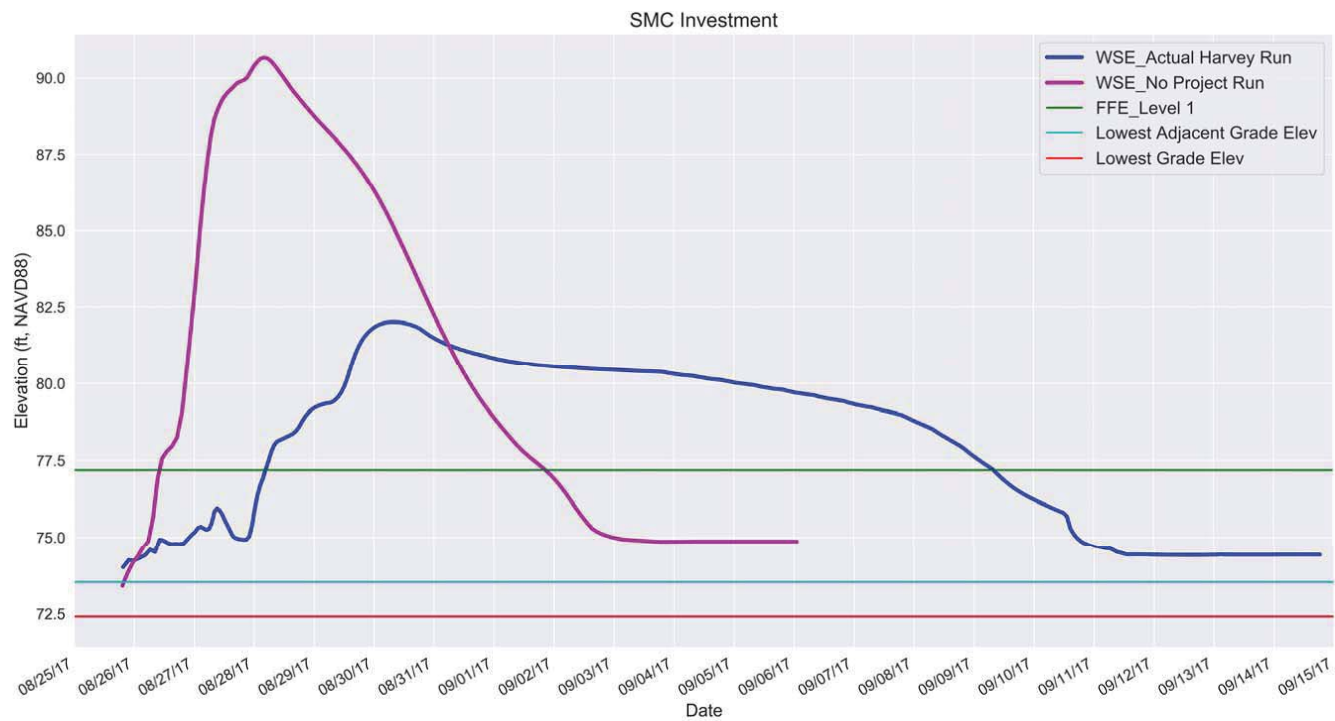


Figure 5.39: Simulated free water surface elevations at the property of Memorial SMC Investment 2013 LP (Actual Harvey Run and No Project I Run)

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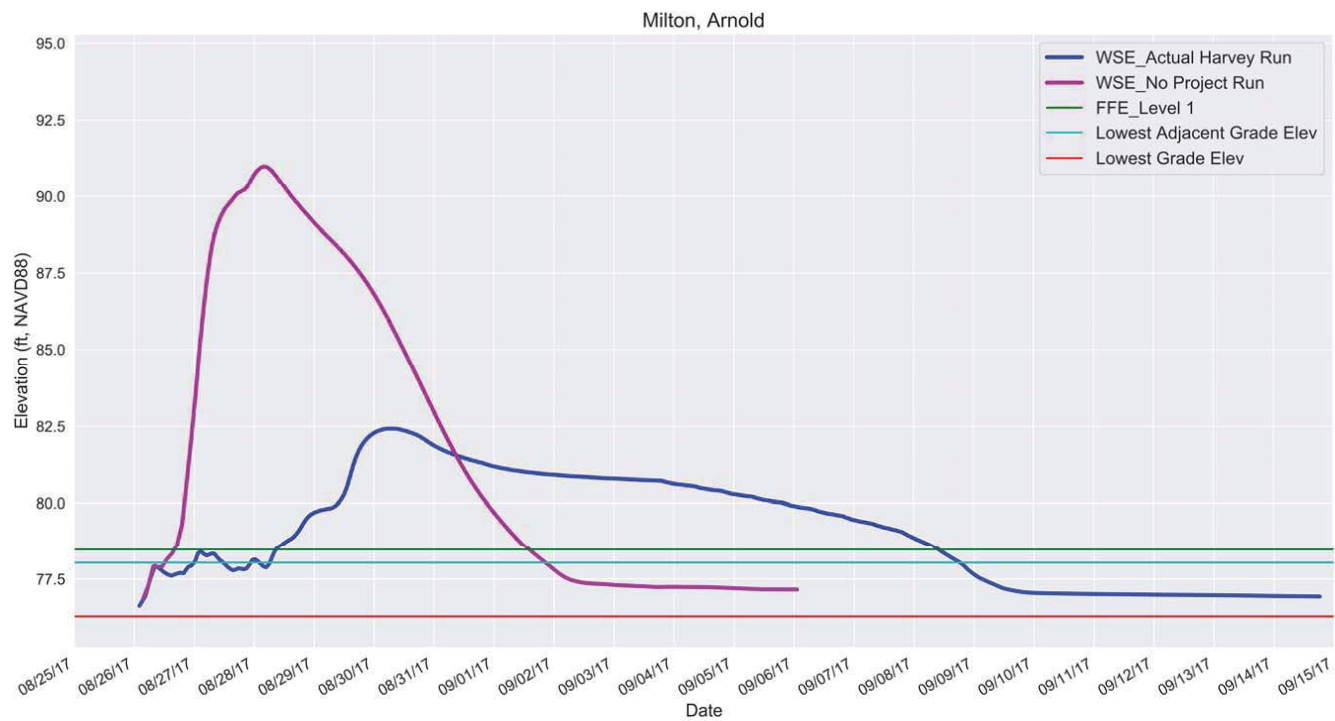


Figure 5.40: Simulated free water surface elevations at the property of Milton, Arnold & Virginia (Actual Harvey Run and No Project I Run)

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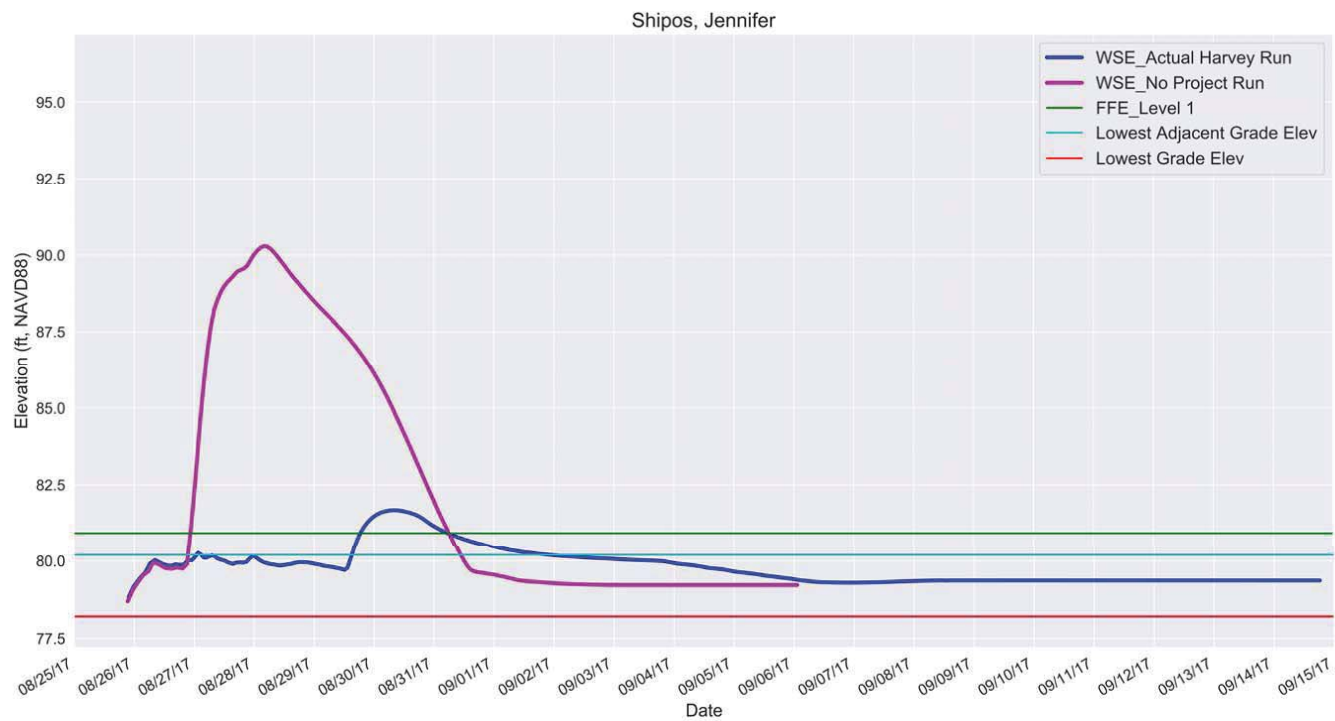


Figure 5.41: Simulated free water surface elevations at the property of Shipos, Jennifer (Actual Harvey Run and No Project I Run)

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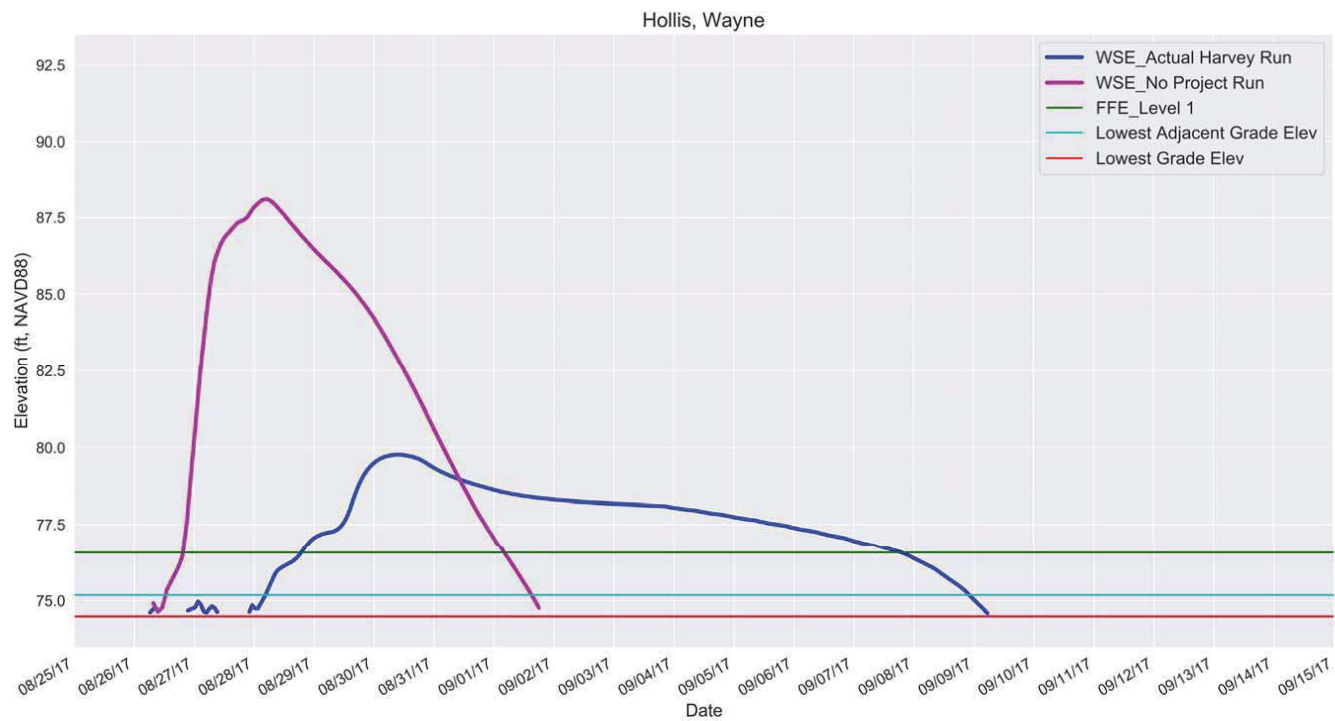


Figure 5.42: Simulated free water surface elevations at the property of Hollis, Wayne & Peggy (Actual Harvey Run and No Project I Run)

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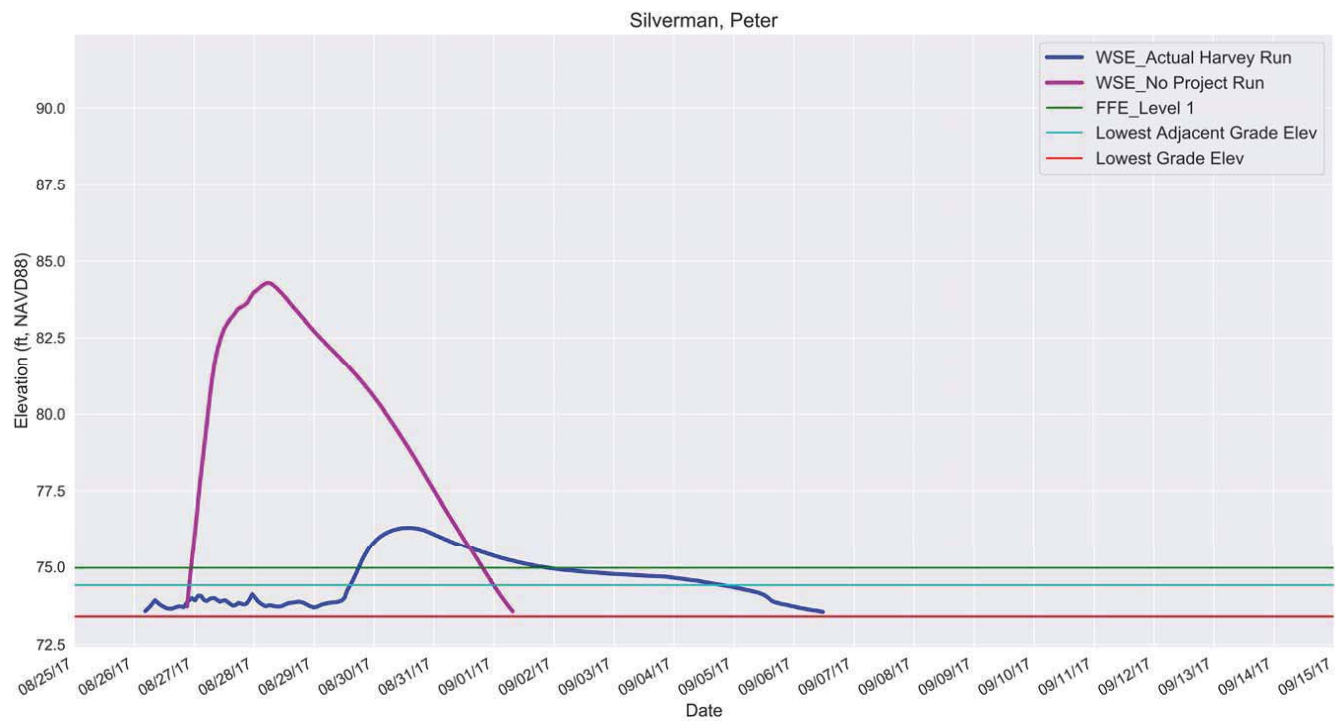


Figure 5.43: Simulated free water surface elevations at the property of Silverman, Peter & Zhennia (Actual Harvey Run and No Project I Run)

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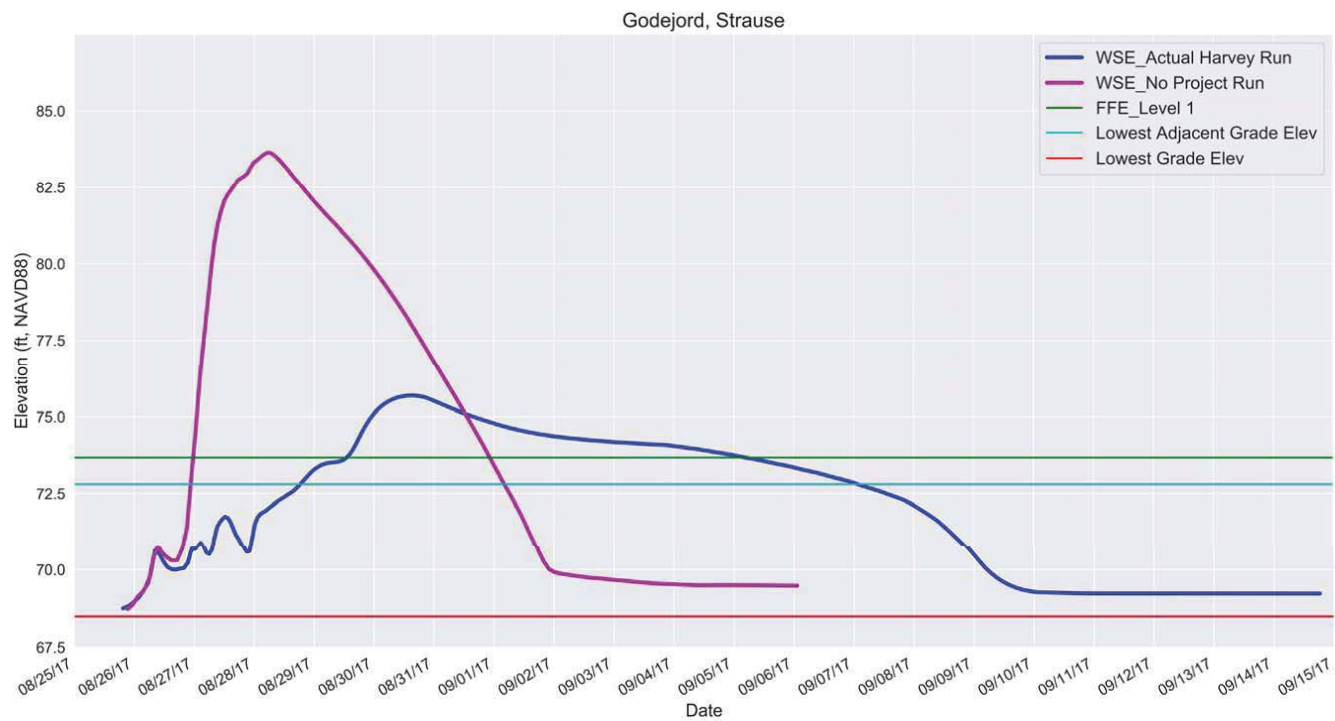


Figure 5.44: Simulated free water surface elevations at the property of Godejord, Arnstein & Inga (Actual Harvey Run and No Project I Run)

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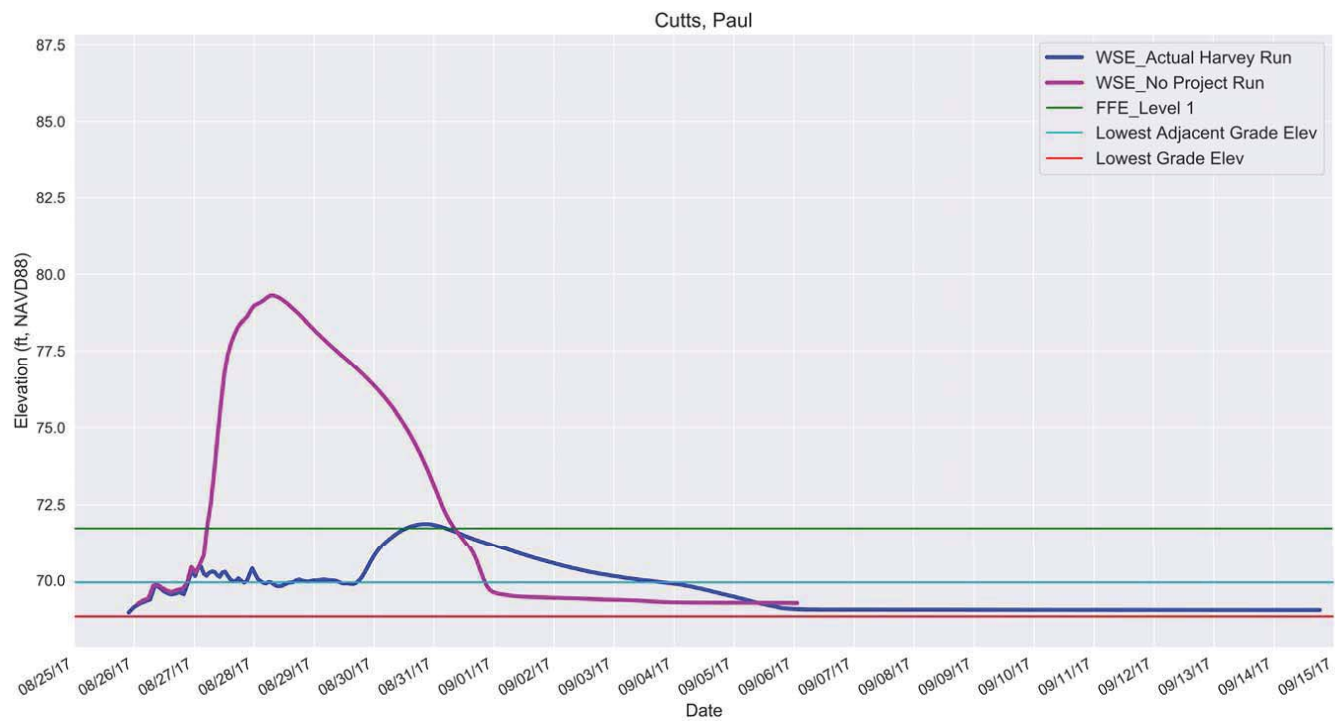


Figure 5.45: Simulated free water surface elevations at the property of Cutts, Paul & Dana (Actual Harvey Run and No Project I Run)

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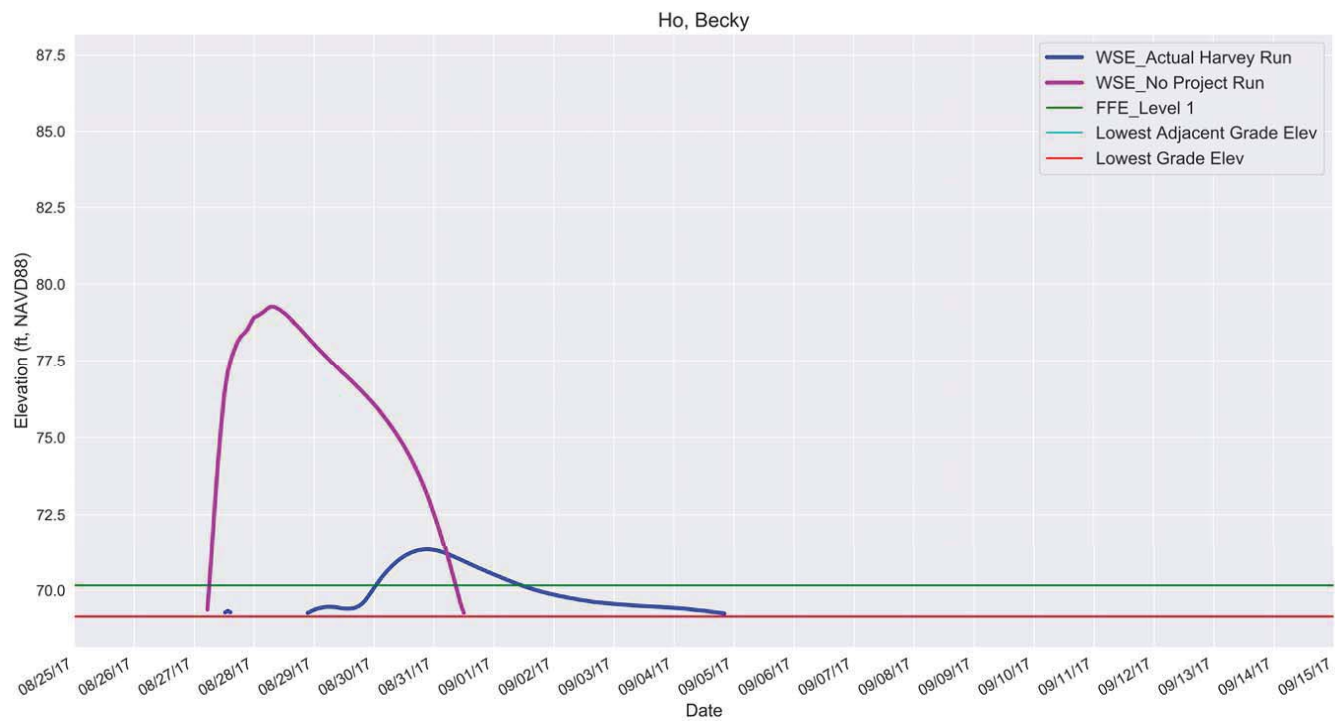


Figure 5.46: Simulated free water surface elevations at the property of Ho, Becky (Actual Harvey Run and No Project I Run)

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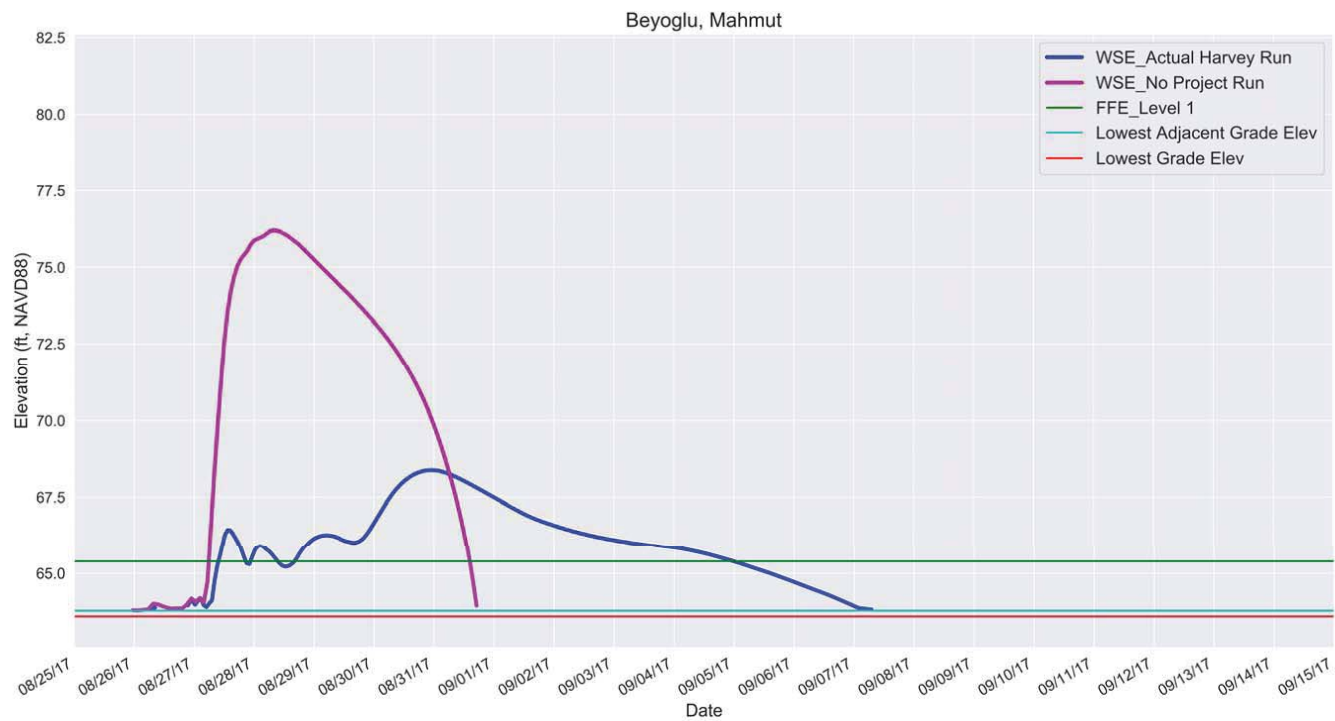


Figure 5.47: Simulated free water surface elevations at the property of Beyoglu, Gokhan & Jana (Actual Harvey Run and No Project I Run)

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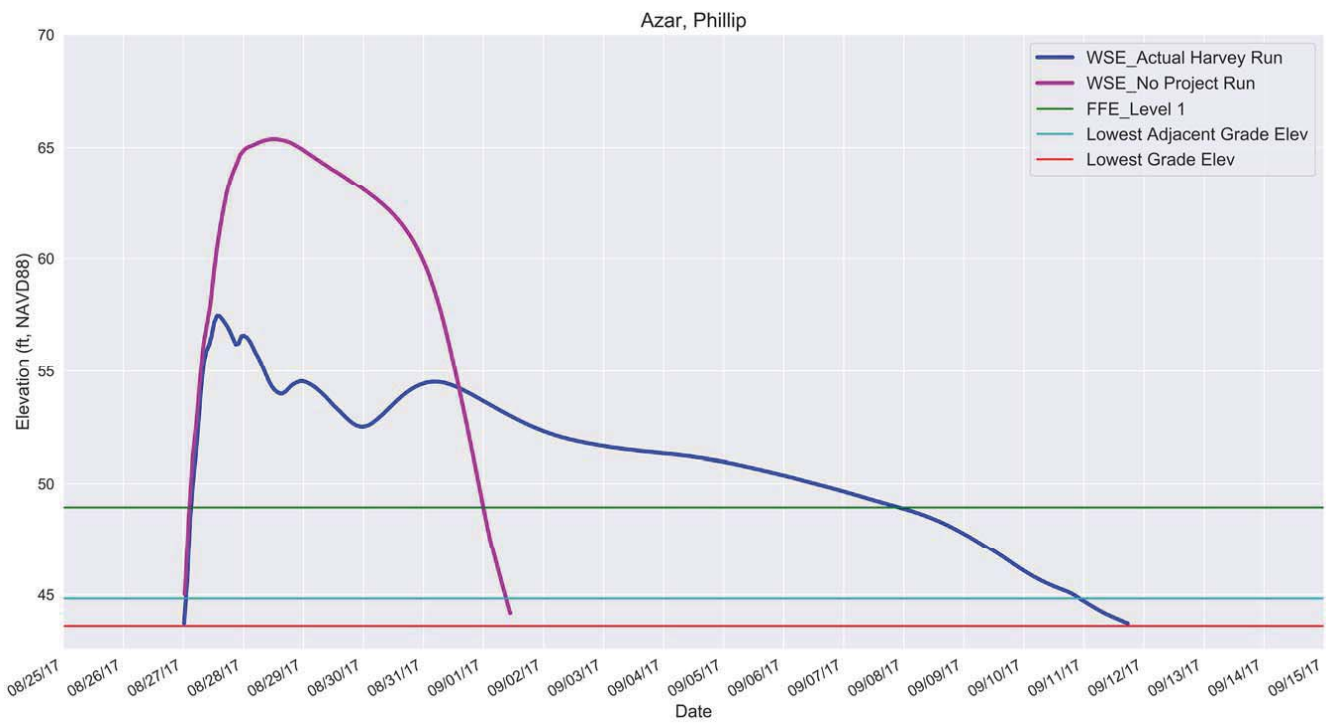


Figure 5.48: Simulated free water surface elevations at the property of Azar, Phillip (Actual Harvey Run and No Project I Run)

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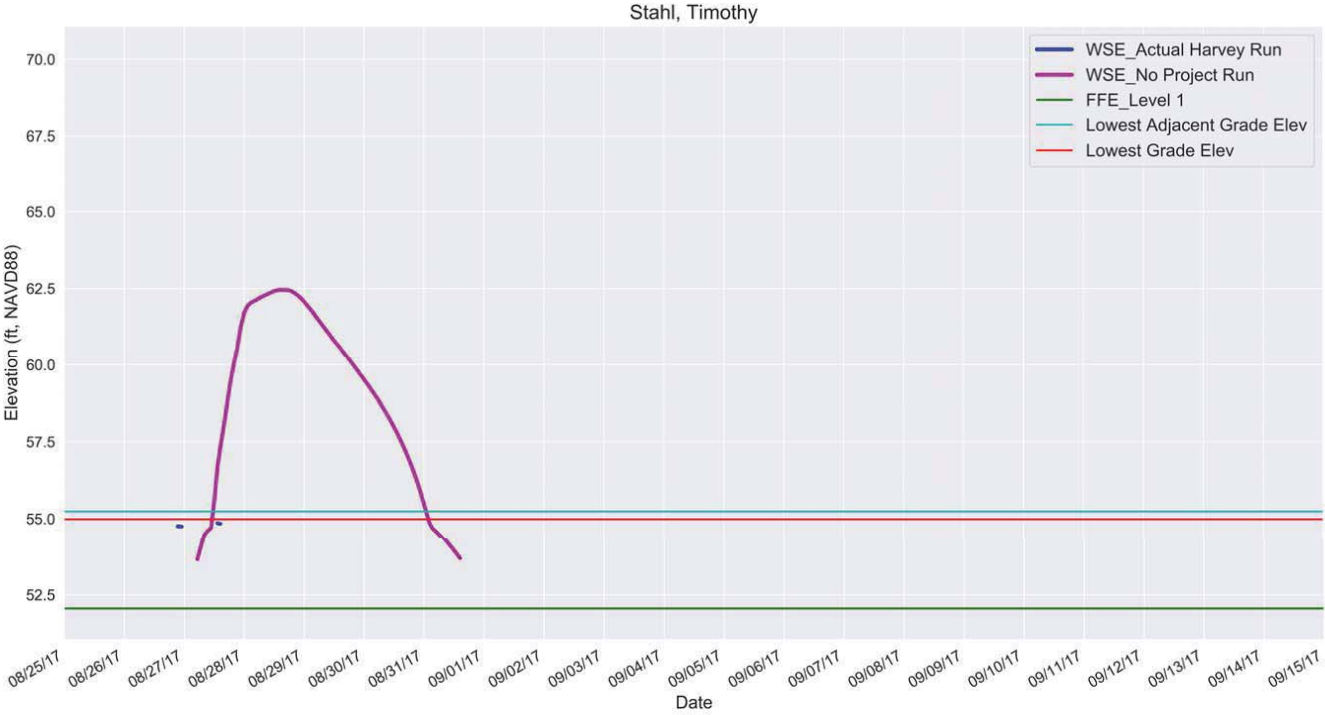


Figure 5.49: Simulated free water surface elevations at the property of Stahl, Timothy (Actual Harvey Run and No Project I Run)

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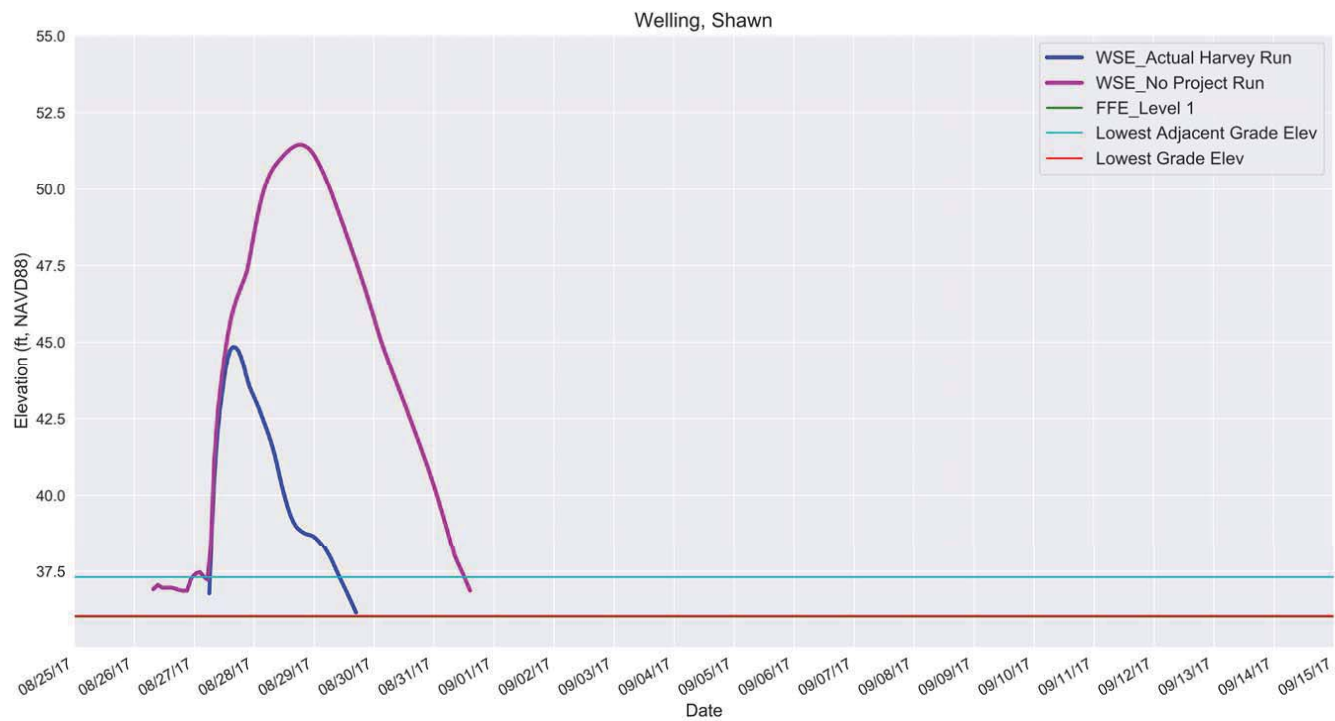


Figure 5.50: Simulated free water surface elevations at the property of Welling, Shawn (Actual Harvey Run and No Project I Run)

5.3.3 No Project II Run

The No Project II Run presents a scenario without the Addicks and Barker Dams but assuming present-day topography and land use. To prepare this analysis, we removed the Addicks and Barker Dams from the Actual Harvey Run and connected the upper tributaries to the lower tributaries (i.e., connecting those tributaries that were cut off by the construction of the reservoirs and dams). The No Project II Run includes the rectified section to lower Buffalo Bayou down to Beltway 8. Table 5.8 presents a summary of the results at downstream Test Plaintiffs' locations for the No Project II Run.

Our analysis shows that the duration of flooding under the No Project II Run is up to 2 days less than the duration of flooding under the No Project I Run. This reduced flood duration is due to the rectification of the lower Buffalo Bayou, which increases conveyance capacity and thereby reduces the duration of flooding on the floodplain.

A tabular comparison of the No Project Runs I and II is presented in in Table 5.10.

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Table 5.8: Summary of the No Project II Run Results at Downstream Test Plaintiffs

Plaintiff	Elevations (ft, NAVD88)					Max Depth above First Finished Floor (ft)	Flooding duration above First Finished Floor
	Lowest Grade	Garage	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Aldred, Val	78.9	80.1	79.4	80.6	-	9.6	3 day, 16 hr
Good Resources, LLC	75.1	-	77.8	78.5	87.4	12.1	3 day, 24 hr
Memorial SMC Investment 2013 LP	72.4	78.2	73.5	77.2	77.3	13.6	4 day, 7 hr
Milton, Arnold & Virginia	76.3	78.6	78.0	78.5	78.6	12.7	4 day, 1 hr
Shipos, Jennifer	78.2	80.5	80.2	80.9	-	9.4	3 day, 13 hr
Hollis, Wayne & Peggy	74.5	76.7	75.2	76.6	-	11.4	4 day, 0 hr
Silverman, Peter & Zhennia	73.4	75.2	74.4	75.0	-	9.2	3 day, 20 hr
Godejard, Arnstein & Inga	68.5	73.5	72.8	73.7	-	9.8	3 day, 24 hr
Cutts, Paul & Dana	68.8	71.1	69.9	71.7	-	7.6	3 day, 20 hr
Ho, Becky (no longer a Test Plaintiff)							
Beyoglu, Gokhan & Jana	63.6	64.8	63.8	65.4	-	10.9	4 day, 7 hr
Azar, Phillip	43.6	48.1	44.8	48.9	-	16.5	4 day, 17 hr
Stahl, Timothy	55.0	55.4	55.2	52.1	55.9	10.5	3 day, 23 hr
Welling, Shawn	36.1	46.8	37.3	36.0	47.4	15.3	4 day, 10 hr

5.3.4 Gates Open Run

The Gates Open Run simulates the Harvey Event under the assumption of uncontrolled release (maximum release) from the dams. As such, this run is identical to the Actual Harvey Run, except that gate height openings were maximized for both dams (6 ft in Addicks and 7 ft in Barker). Table 5.9 presents a summary of the Gates Closed Run results at the downstream Test Plaintiffs' locations.

Downstream of the reservoirs the simulated water surface elevations (and depth of floodwater above the first finished floor) under the uncontrolled releases (gates fully open) scenario are 0.9 to 3.7 ft higher than the actual controlled release Harvey scenario. In addition, simulated flooding durations under the hypothetical ungated conduits scenario are longer than those estimated for the Actual Harvey Run downstream of the dams. The gated conduits at Addicks and Barker Dams effectively reduced flooding impacts downstream of the dams during the Harvey Event.

A tabular comparison of the Actual Harvey Run and the Gates Open Run is presented in Table 5.10.

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Table 5.9: Summary of the Gates Open Run Results at Downstream Test Plaintiffs

Plaintiff	Elevations (ft, NAVD88)					Maximum Depth above First Finished Floor (ft)	Flood duration above First Finished Floor
	Lowest Grade	Garage	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Aldred, Val	78.9	80.1	79.4	80.6	-	2.9	10 day, 19 hr
Good Resources, LLC	75.1	-	77.8	78.5	87.4	4.9	13 day, 8 hr
Memorial SMC Investment 2013 LP	72.4	78.2	73.5	77.2	77.3	6.2	13 day, 22 hr
Milton, Arnold & Virginia	76.3	78.6	78.0	78.5	78.6	5.5	13 day, 10 hr
Shipos, Jennifer	78.2	80.5	80.2	80.9	-	2.3	7 day, 22 hr
Hollis, Wayne & Peggy	74.5	76.7	75.2	76.6	-	4.7	13 day, 7 hr
Silverman, Peter & Zhennia	73.4	75.2	74.4	75.0	-	2.9	11 day, 18 hr
Godejord, Arnstein & Inga	68.5	73.5	72.8	73.7	-	3.7	12 day, 23 hr
Cutts, Paul & Dana	68.8	71.1	69.9	71.7	-	2.7	5 day, 17 hr
Ho, Becky (no longer a Test Plaintiff)							
Beyoglu, Gokhan & Jana	63.6	64.8	63.8	65.4	-	6.0	13 day, 4 hr
Azar, Phillip	43.6	48.1	44.8	48.9	-	12.2	13 day, 22 hr
Stahl, Timothy	55.0	55.4	55.2	52.1	55.9	5.3	3 day, 1 hr
Welling, Shawn	36.1	46.8	37.3	36.0	47.4	9.7	4 day, 20 hr

5.3.5 Harvey-Related Model Results Summary

Table 5.10 summarizes results of Harvey-related runs for the downstream Test Plaintiffs. Maximum inundation depths are calculated as the difference between the maximum simulated water surface elevation and the elevation of the first finished floor at each Test Plaintiff. The duration of flooding above the first finished floor shown in the table is the total duration from the start of the first flooding period to the end of the last flooding period.

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Table 5.10: Summary of Harvey-related run results for Downstream Test Plaintiffs

Plaintiff	Maximum depth of inundation above FFE (ft)				Duration (hr)			
	Actual Harvey	No Project I	No Project II	Gates Open	Actual Harvey	No Project I	No Project II	Gates Open
Aldred, Val	1.5	9.8	9.6	2.9	119	105	88	259
Good Resources, LLC	3.5	12.0	12.1	4.9	248	126	96	320
Memorial SMC Investment 2013 LP	4.8	13.5	13.6	6.2	291	153	103	334
Milton, Arnold & Virginia	4.0	12.5	12.7	5.5	264	139	97	322
Shipos, Jennifer	0.7	9.4	9.4	2.3	34	103	85	190
Hollis, Wayne & Peggy	3.2	11.5	11.4	4.7	239	126	96	319
Silverman, Peter & Zhennia	1.3	9.3	9.2	2.9	75	115	92	282
Godejord, Arnstein & Inga	2.0	10.0	9.8	3.7	159	116	96	311
Cutts, Paul & Dana	0.1	7.6	7.6	2.7	14	99	92	137
Ho, Becky (no longer a Test Plaintiff)								
Beyoglu, Gokhan & Jana	3.0	10.8	10.9	6.0	204	102	103	316
Azar, Phillip	8.5	16.4	16.5	12.2	282	116	113	334
Stahl, Timothy	2.8	10.4	10.5	5.3	17	105	95	73
Welling, Shawn	8.8	15.4	15.3	9.7	59	127	106	116

5.3.6 Historical Runs

Historical runs are similar to the No Project I Run in setup, but they simulate other historical storms. For these runs, we used the same topography within the GOL that we used in the No Project I Run (representing 1940's era conditions with no dams or channel improvements), and the topography and land use on private land as of the date of the storm. Table 5.11 presents simulated maximum inundation depths and durations of flooding above first finished floor for the downstream Test Plaintiffs. Figure 5.53 to Figure 5.64 show simulated water surface elevations at downstream Test Properties under various historical rainfall events without the federal project. Our analysis shows that, without the federal project, downstream Test Properties would have flooded frequently, and substantially, during other storms.

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Table 5.11: Summary of results of Historical runs at Downstream Test Plaintiffs

Plaintiff	Maximum depth of inundation (ft)						Duration (hr)					
	2001	2016	1994	2015	2009	1975	2001	2016	1994	2015	2009	1975
Aldred, Val	0.9	8.2	4.5	-	-	-	21	62	51	-	-	-
Good Resources, LLC	2.0	10.3	6.5	-	-	-	38	75	66	-	-	-
Memorial SMC Investment 2013 LP	3.3	11.7	7.9	1.1	-	0.5	57	87	82	38	-	35
Milton, Arnold & Virginia	2.1	10.8	6.9	0.2	-	0.1	40	82	73	15	-	5
Shipos, Jennifer	-	7.6	3.8	-	-	-	-	57	43	-	-	-
Hollis, Wayne & Peggy	1.9	9.9	6.3	-	-	-	35	74	64	-	-	-
Silverman, Peter & Zhennia	-	7.4	4.0	-	-	-	-	67	53	-	-	-
Godejord, Arnstein & Inga	-	8.0	4.3	-	-	-	-	68	54	-	-	-
Cutts, Paul & Dana	-	5.8	1.4	-	-	-	-	54	31	-	-	-
Ho, Becky (no longer a Test Plaintiff)										-	-	
Beyoglu, Gokhan & Jana	-	9.1	4.0	-	-	-	-	60	35	-	-	-
Azar, Phillip	-	14.5	7.5	-	-	-	-	70	45	-	-	-
Stahl, Timothy	-	7.6	-	2.6	2.6	-	-	55	-	191	120	-
Welling, Shawn	2.3	8.1	1.2	1.4	0.7	1.1	153	106	90	60	-	90

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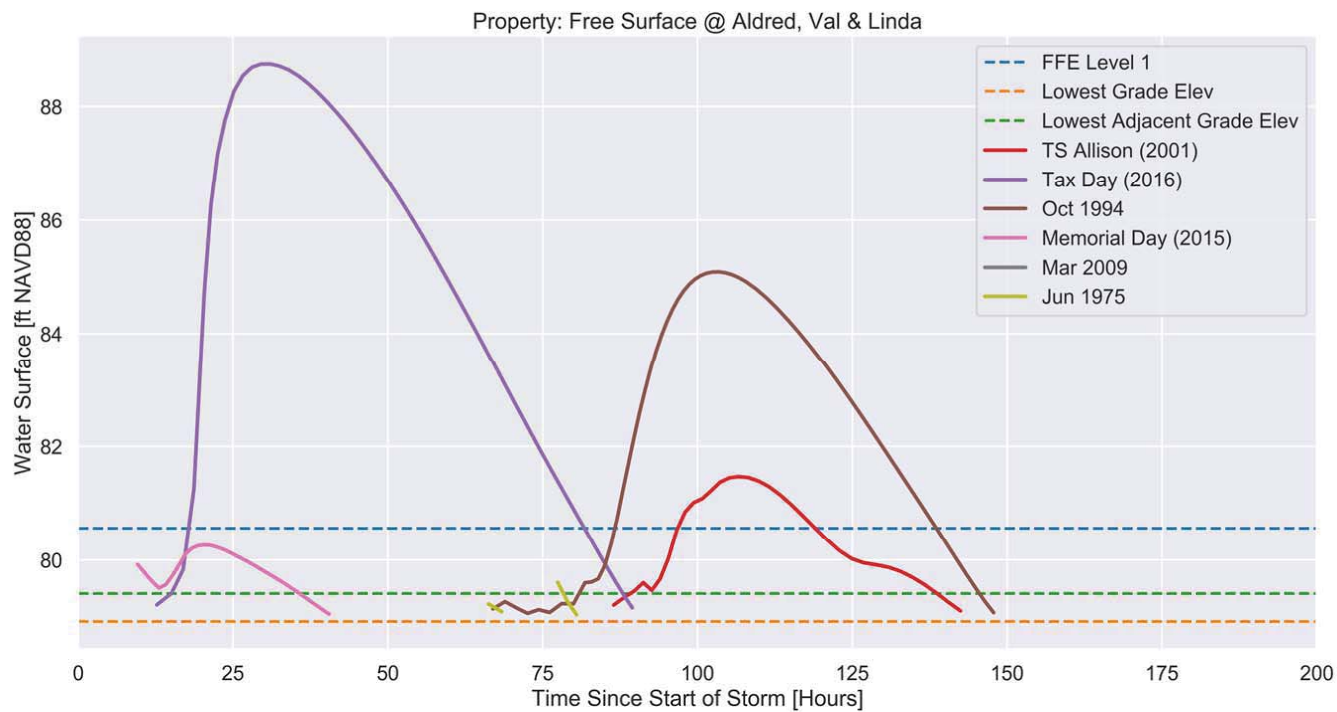


Figure 5.51: Simulated free water surface elevations at the property of Aldred, Val & Linda (Historical Storms)

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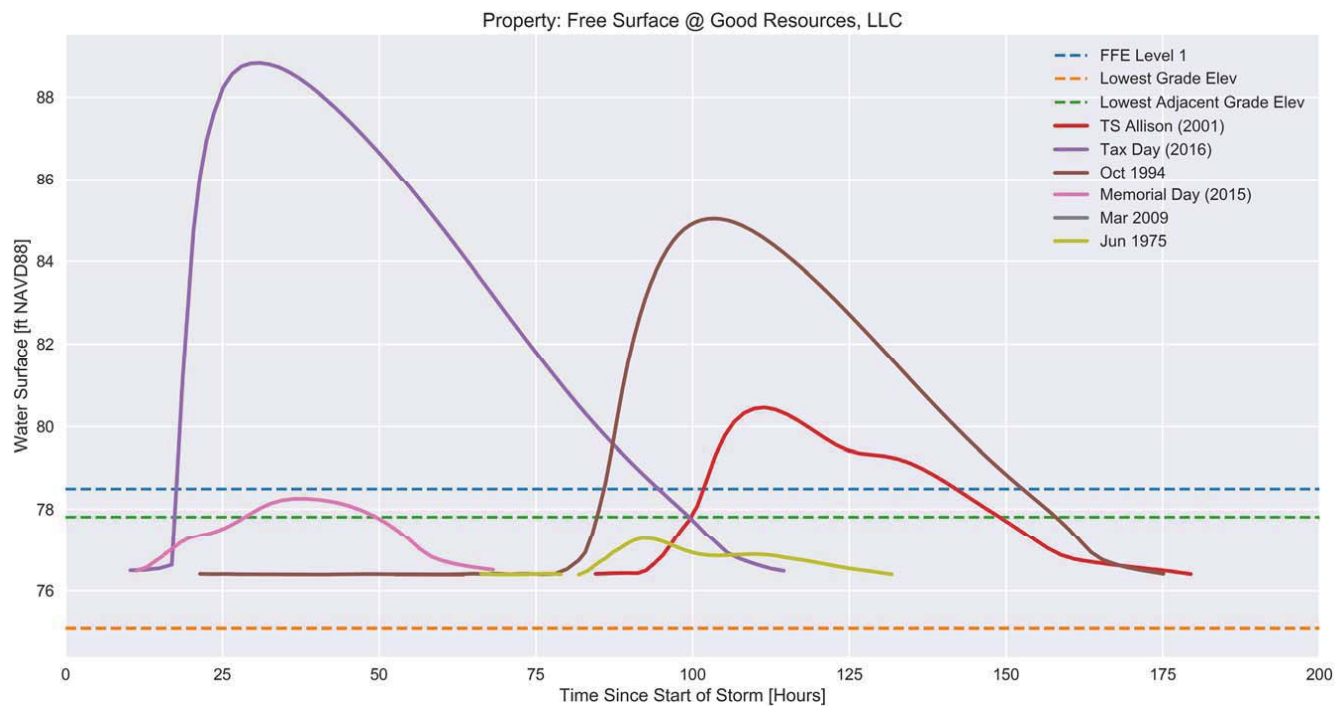


Figure 5.52: Simulated free water surface elevations at the property of Good Resources, LLC (Historical Storms)

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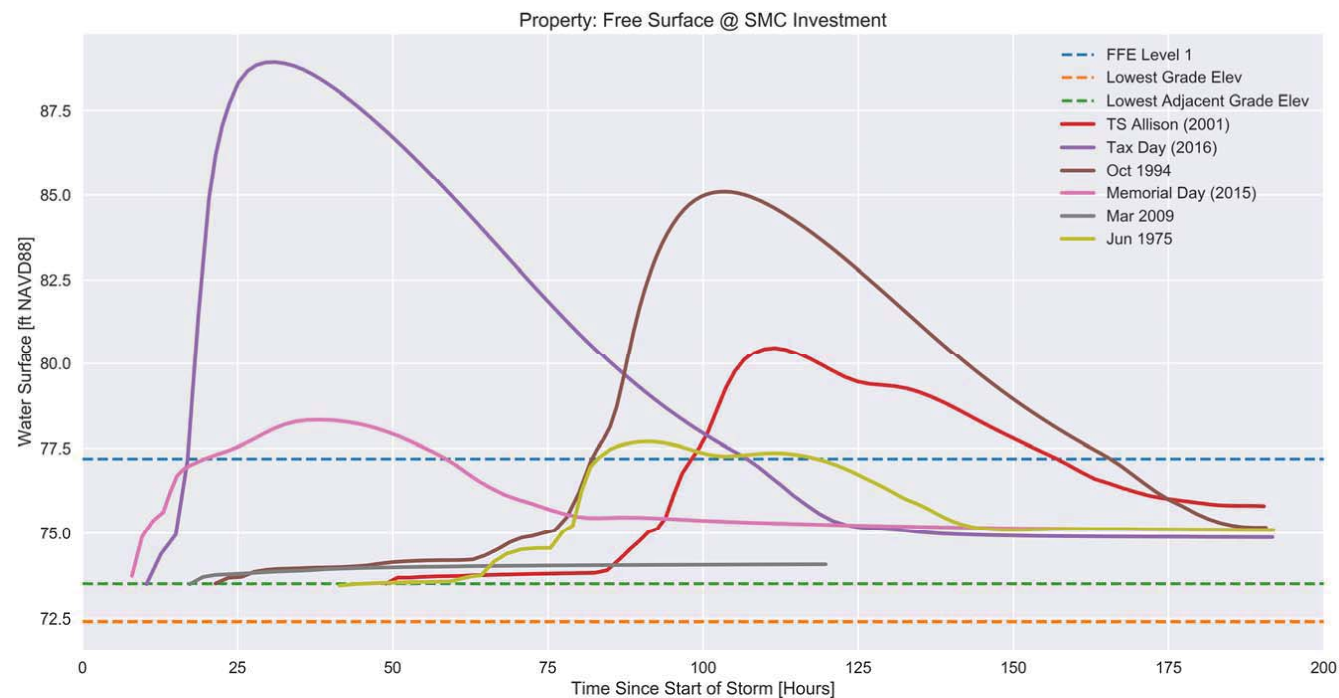


Figure 5.53: Simulated free water surface elevations at the property of Memorial SMC Investment 2013 LP (Historical Storms)

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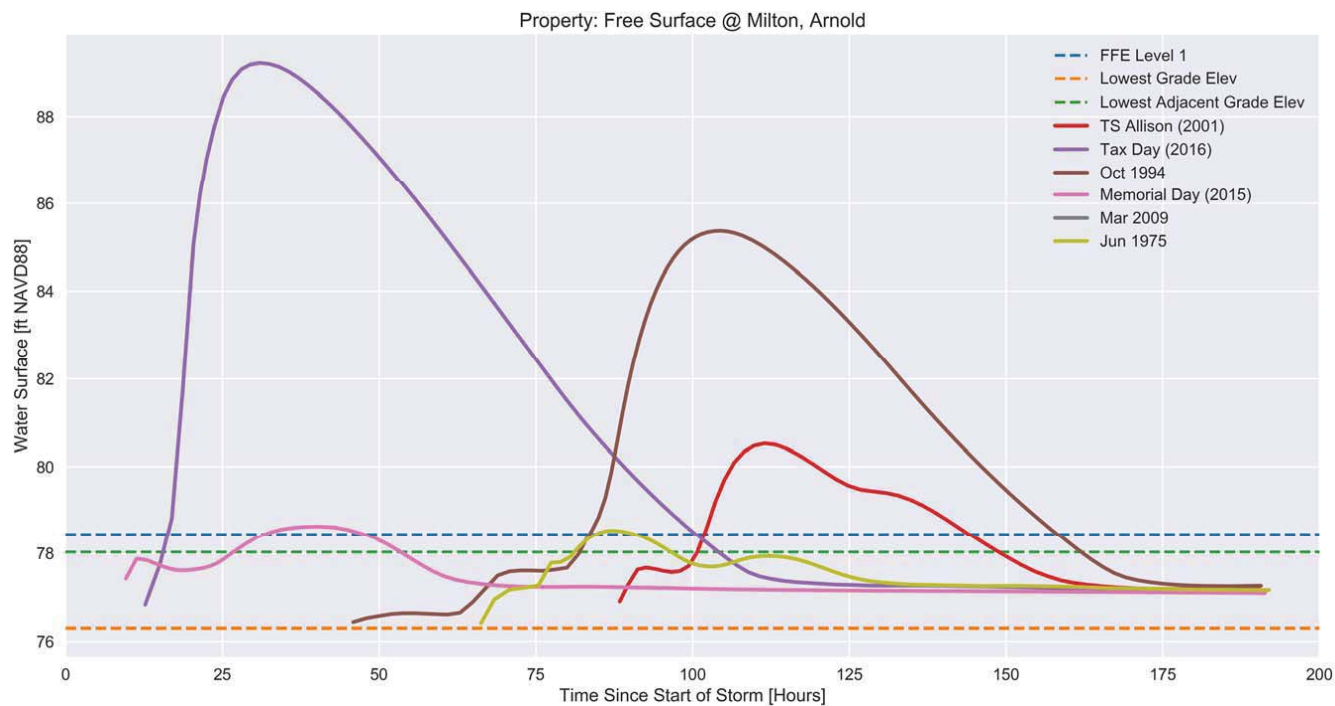


Figure 5.54: Simulated free water surface elevations at the property of Milton, Arnold & Virginia (Historical Storms)

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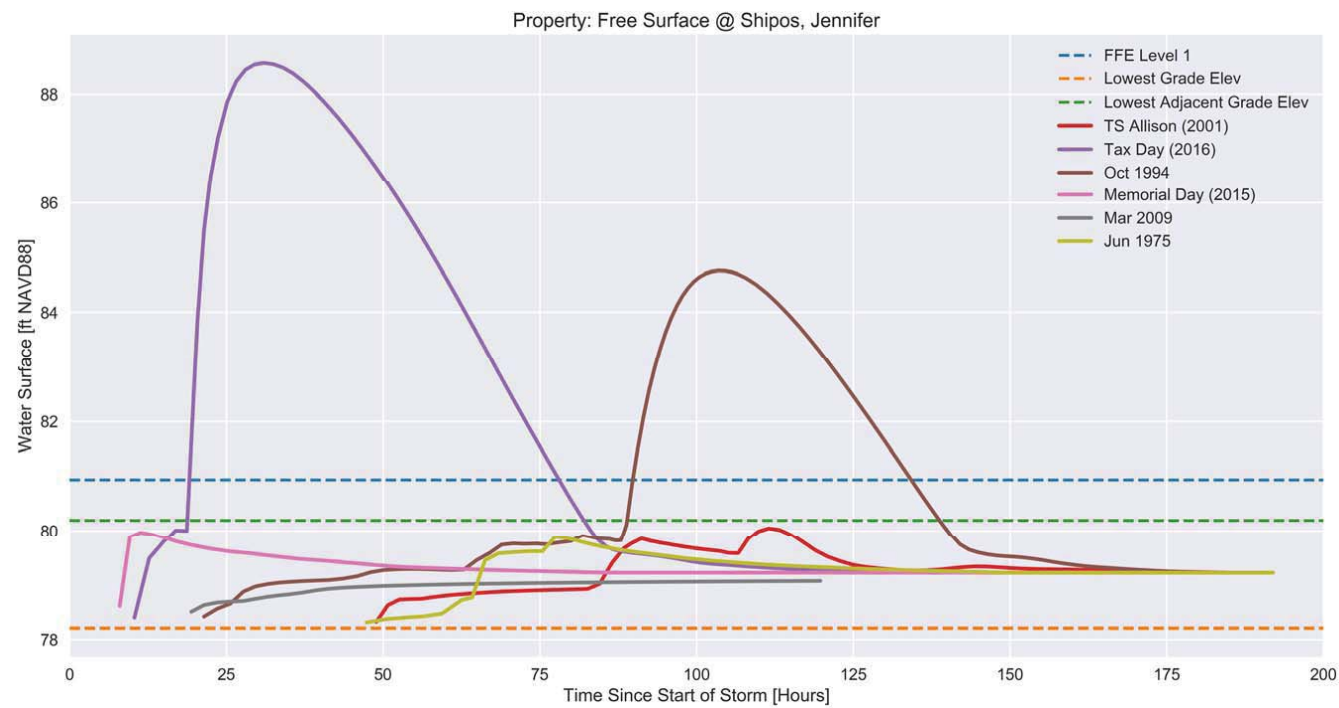


Figure 5.55: Simulated free water surface elevations at the property of Shipos, Jennifer (Historical Storms)

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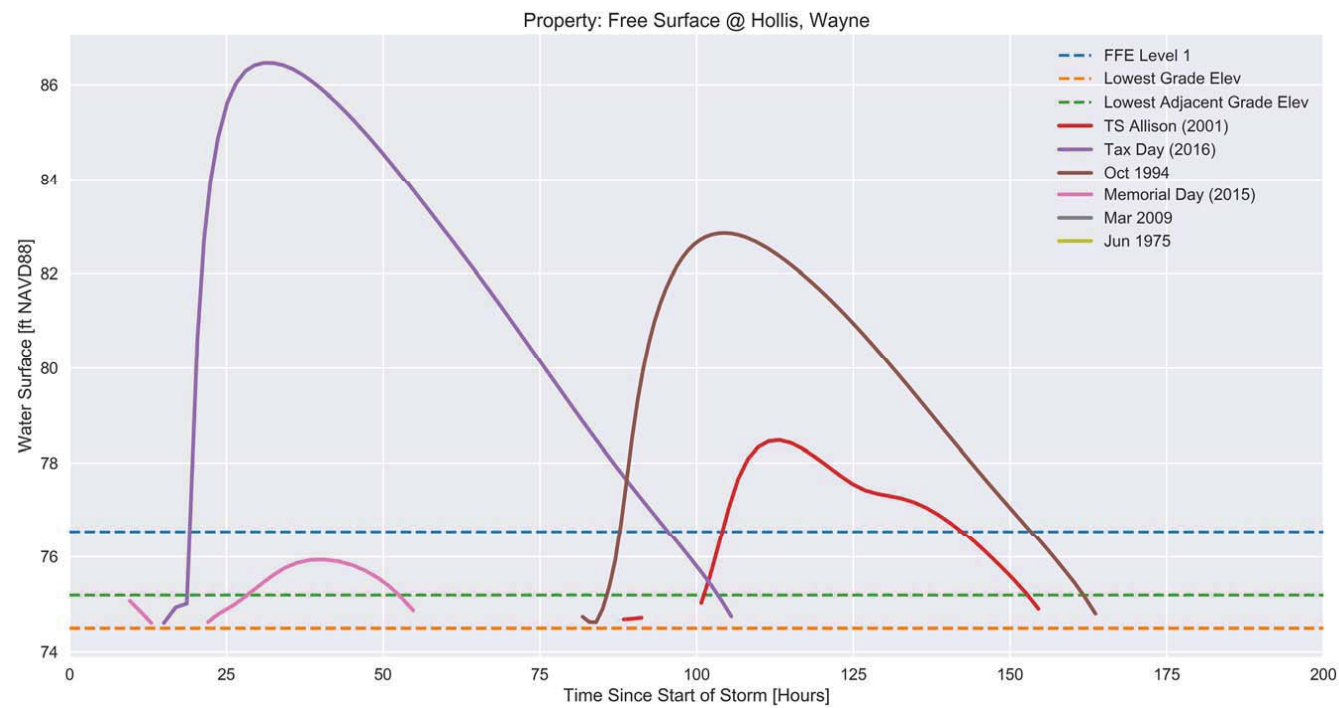


Figure 5.56: Simulated free water surface elevations at the property of Hollis, Wayne & Peggy (Historical Storms)

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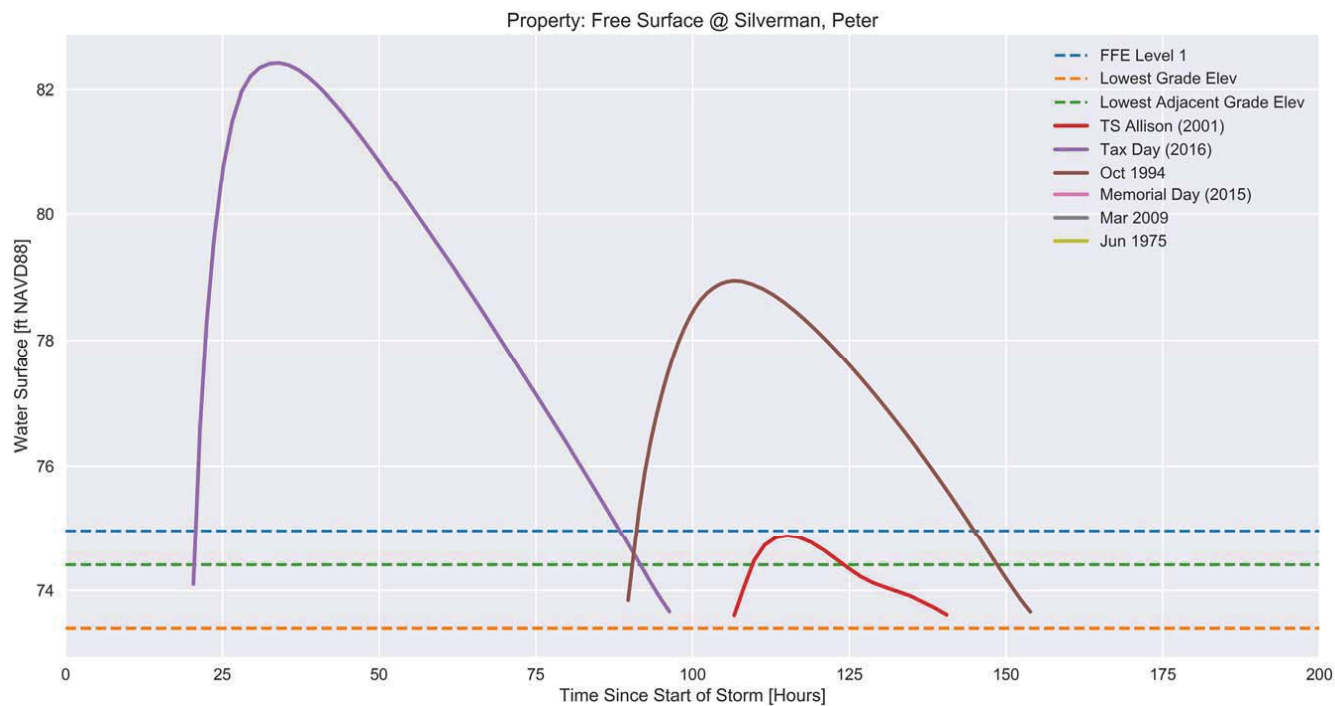


Figure 5.57: Simulated free water surface elevations at the property of Silverman, Peter & Zhennia (Historical Storms)

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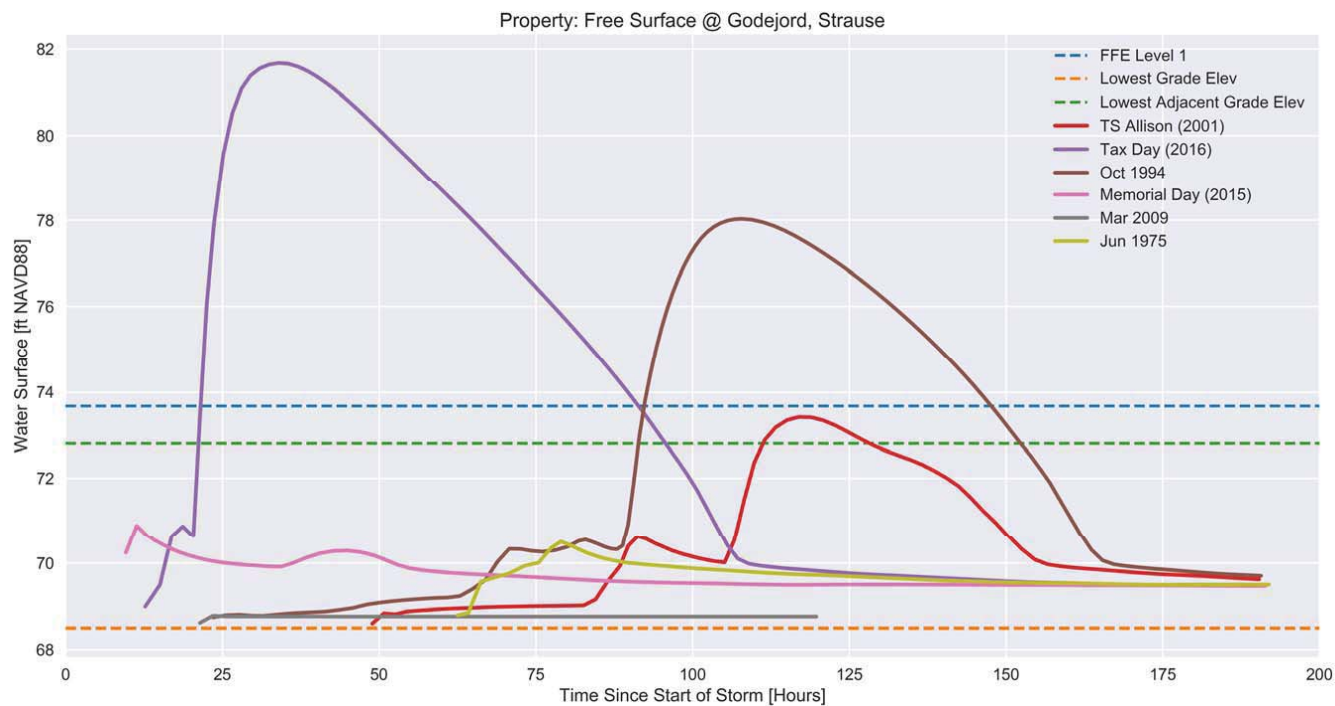


Figure 5.58: Simulated free water surface elevations at the property of Godejord, Arnstein & Inga (Historical Storms)

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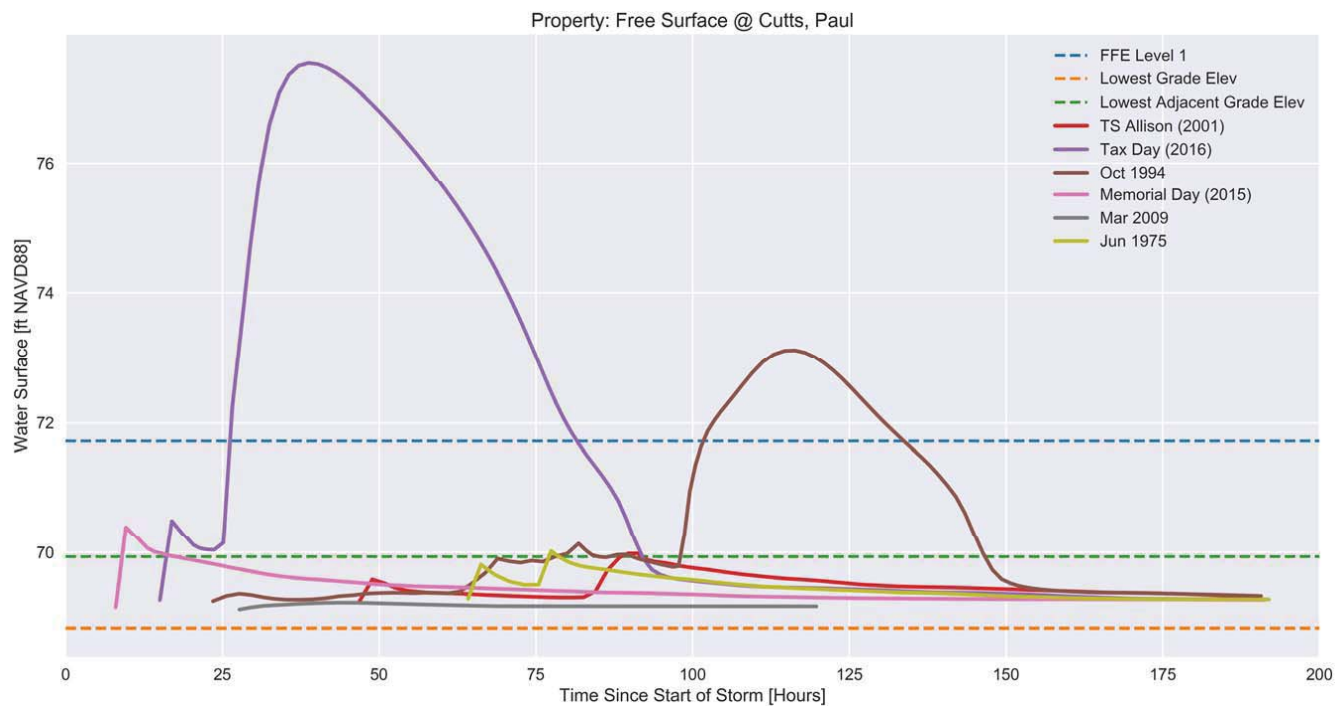


Figure 5.59: Simulated free water surface elevations at the property of Cutts, Paul & Dana (Historical Storms)

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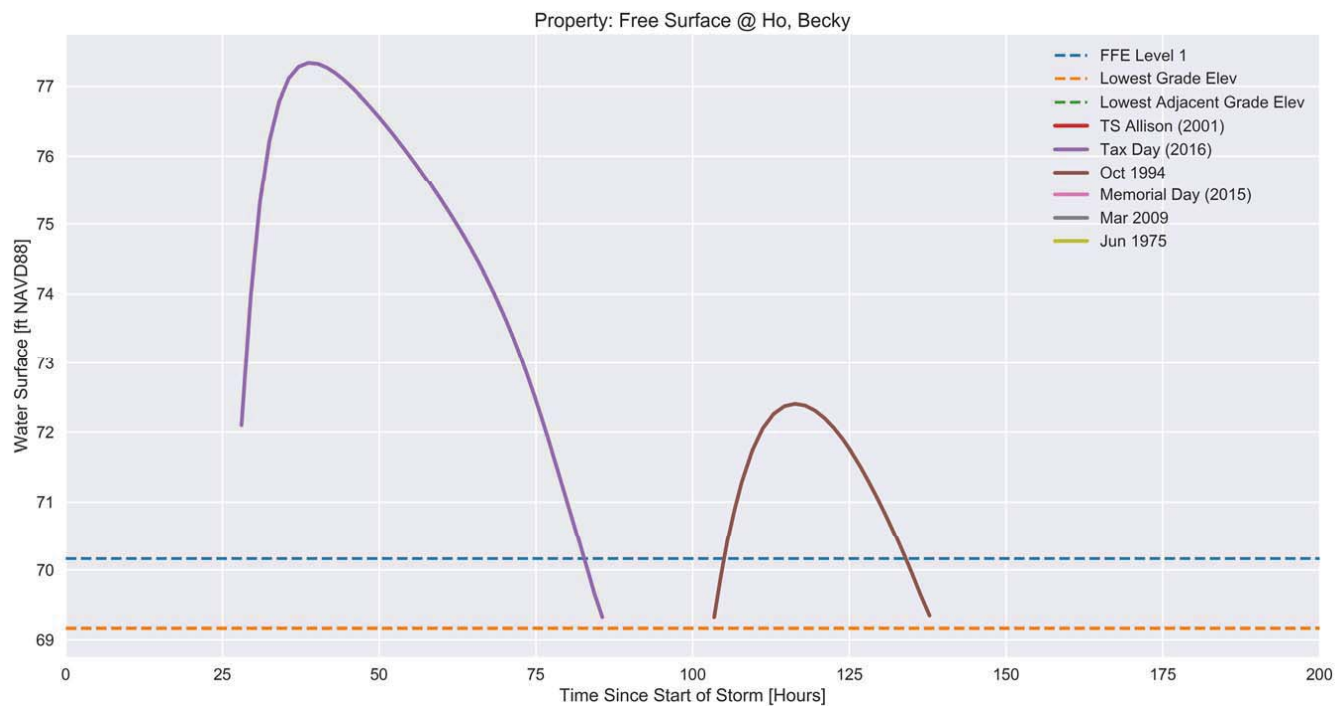


Figure 5.60: Simulated free water surface elevations at the property of Ho, Becky (Historical Storms)

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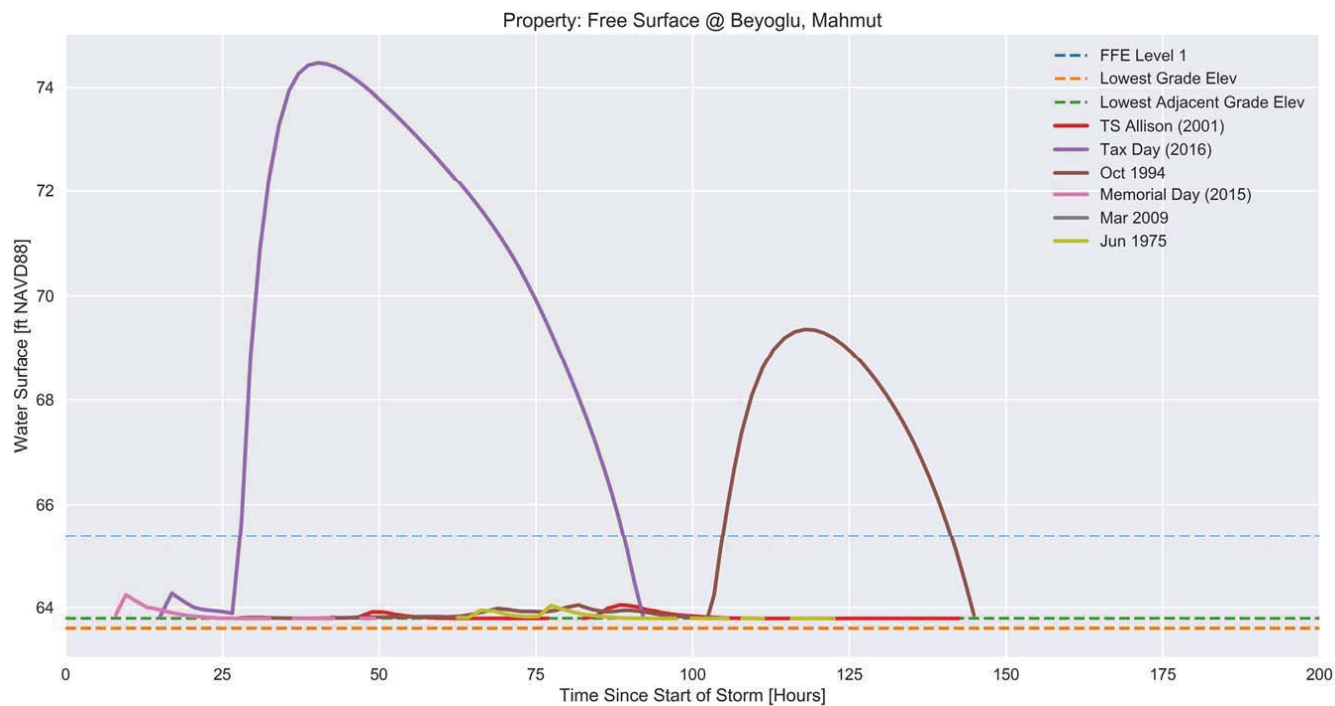


Figure 5.61: Simulated free water surface elevations at the property of Beyoglu, Gokhan & Jana (Historical Storms)

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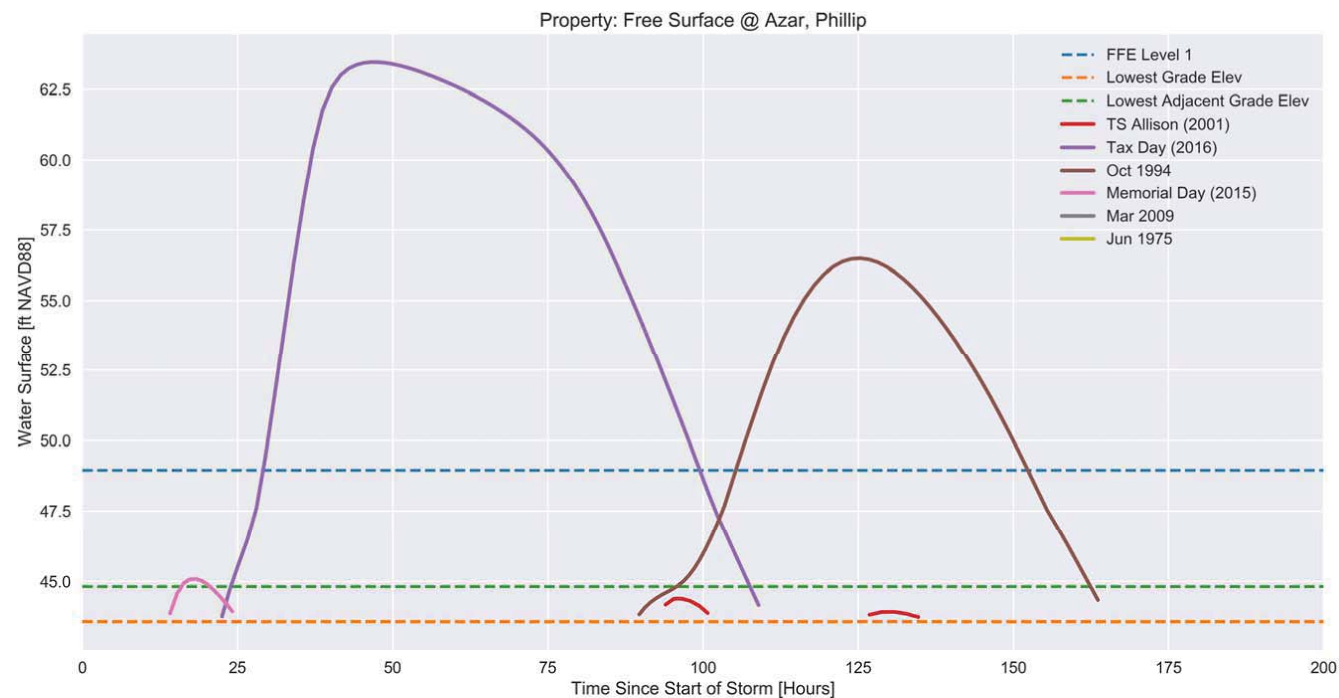


Figure 5.62: Simulated free water surface elevations at the property of Azar, Phillip (Historical Storms)

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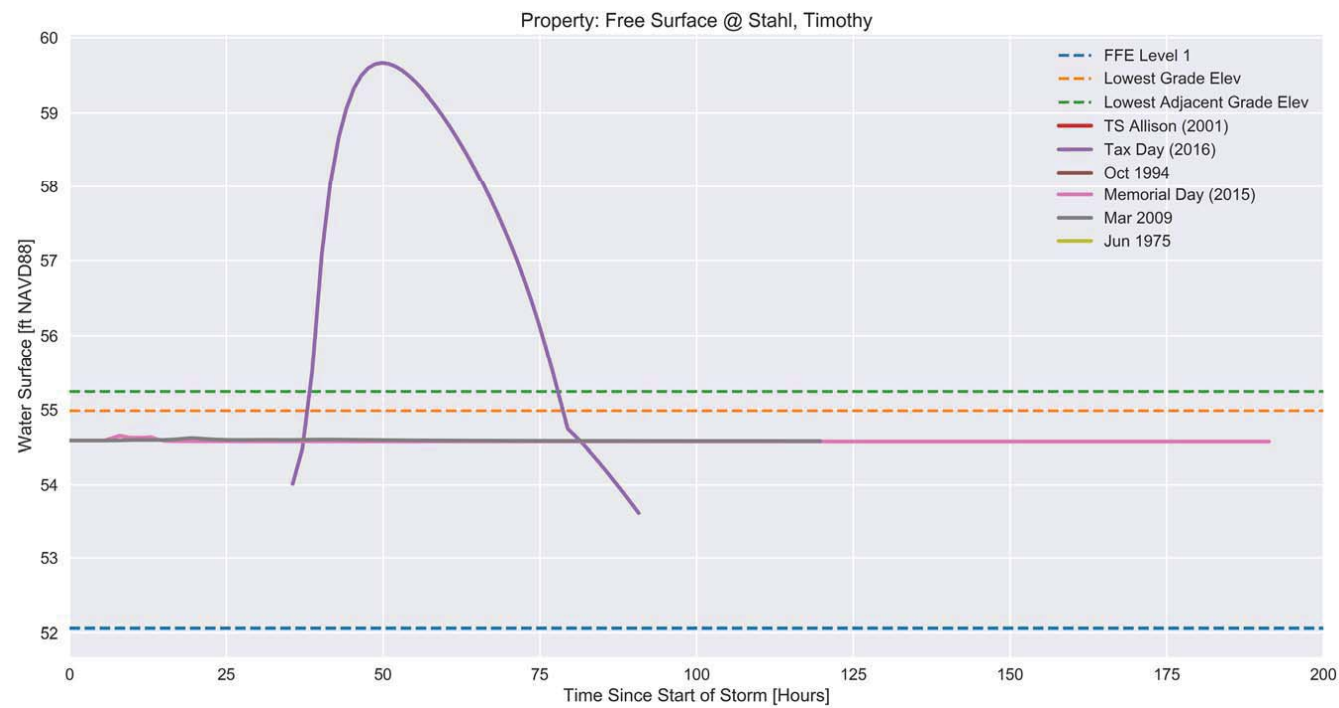


Figure 5.63: Simulated free water surface elevations at the property of Stahl, Timothy (Historical Storms)

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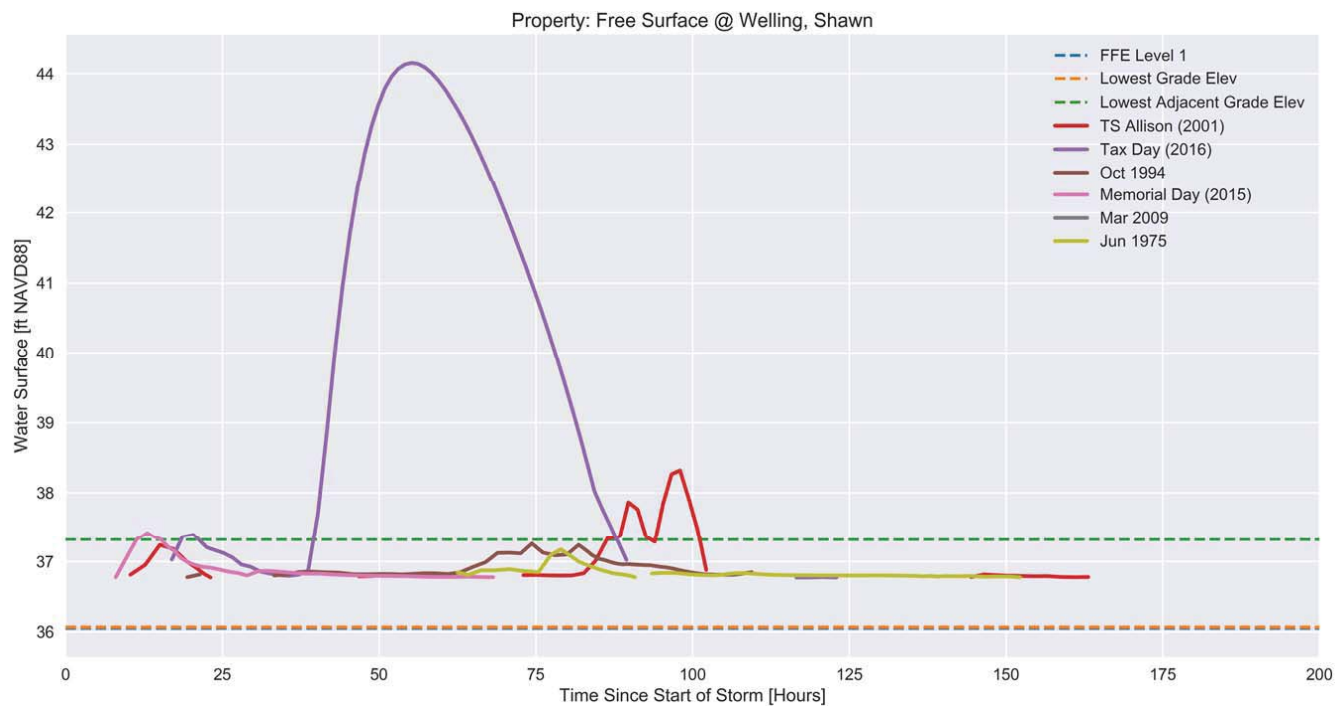


Figure 5.64: Simulated free water surface elevations at the property of Welling, Shawn (Historical Storms)

6. Conclusions

The objective of this hydraulic study was to define hydraulic factors that resulted in inundation during the Harvey Event at downstream Test Properties. To address this objective, we reviewed pertinent gage data and background documents. In addition, we developed a numerical model to simulate inundation during the Harvey Event to provide a full description of inundation in time and space and to simulate hypothetical scenarios to define and/or isolate hydraulic factors contributing to inundation. In addition, we used this numerical model to simulate flooding due to other historical events in the absence of the Addicks and Barker Dams.

Characteristics of overbank flooding downstream of the dams

The following summarizes flow characteristics downstream of the Addicks and Barker Reservoirs during the Harvey Event:

- Flow in lower Buffalo Bayou was dominated by rainfall-runoff processes between 8/26/2017 morning and 8/28/2017 morning (period of most intense rainfall) and over the course of 28 August transitioned to a condition dominated by the release from Addicks and Barker starting midday 8/29/2018.
- Overbank flooding started due to surface runoff from local rainfall prior to gate releases for all stations considered, except at Lower Langham Creek downstream of the Addicks gates.
- Gate release did not significantly impact the flow depth downstream of Beltway 8 but may have extended the duration of inundation.
- Analysis of gage data shows evidence of backwater upstream of Beltway 8 at the transition between rectified and natural sections of Buffalo Bayou and the associated constriction. Backwater also occurred upstream of Piney Point due to channel constriction.
- Measured stage elevations and estimated discharges at the Shepherd Drive gage during the Harvey Event (at least during the period between 8/27/2017 16:00 and 8/28/2017 07:00) are questionable and cannot be relied upon in the analysis.
- Lower Langham Creek was backwatered on 8/28/2017 (prior to the start of the second flood wave) due to high water surface elevations in lower Buffalo Bayou.
- The start of bank flooding in Lower Langham Creek during the evening of 8/28/2017 is attributed to backwater caused by high water surface elevations in lower Buffalo Bayou due to extensive runoff combined with the continuous release from Addicks and Barker Reservoirs. The second flood wave release has contributed to another 2 feet rise in the elevation of the gage at the Addicks outlet from 80 feet to 82 feet.
- A nearly uniform flow condition was established between Dairy Ashford Road and Piney Point Road starting from 9/5/2017. It required about 6 days after the rainfall stopped to release the stored water (including water backed up upstream Piney Point and water stored in detention ponds or upstream any other obstruction) through the Piney Point constriction to establish a nearly uniform flow condition.

The reason for the start of overbank flooding in areas below the dams is the excessive runoff related to local rainfall prior to the start of releases from the dams (with the exception of Lower Langham Creek). Excessive runoff below the dams resulted in rising water surface elevations in Lower Buffalo Bayou causing backwater in lower tributaries, which is the main reason for the initiation of flooding in Rummel Creek and has contributed to flooding in Lower Langham Creek. The first phase of the releases from Addicks Reservoir contributed to flooding in Lower Langham Creek.

Overbank flooding downstream first occurred due to local rainfall and related surface runoff prior to the Corps' gate releases for all but one of the gages, the lower Langham Creek gage located immediately downstream of the Addicks gates.

Hurricane Harvey exceeded Addicks and Barker Reservoirs hydraulic design conditions

The Addicks and Barker Dams are designed for short term impoundment of storm water runoff. The United States Army Corps of Engineers (the Corps) designed the reservoirs based on inflow hydrographs exceeding the estimated runoff during the 1935 flood, which was the storm of record at that time.

After construction of the dams, the concept of Standard Project Floods (SPFs) entered the lexicon. The SPF is the flood that represents the most severe hydrologic conditions considered reasonably characteristic of the geographic region. The SPF has been revised for the dams over time. It was defined in the 1962 Reservoir Regulation Manual and most recently updated in the 1977 Hydrology Report. During the 2017 Hurricane Harvey event, the combined cumulative inflows to Addicks and Barker Reservoirs reached at least 450,000 acre-feet. This exceeded the 1962 SPF cumulative inflows by 63% (in addition to exceeding the 1962 SPF peak inflows by 2 to 4 times) and exceeded the 1977 revised SPF cumulative inflow to Addicks and Barker Reservoirs by 41%. The Harvey Event also exceeded the 2012 Water Control Manual SPF water surface elevations and resulted in uncontrolled spill around the north end of Addicks Reservoir for the first time in the history of the project. Due to the intensity and duration of rainfall associated with the Harvey Event, the Corps made releases in accordance with the induced surcharge release schedule for the first time in the history of the two reservoirs.

The Harvey Event exceeded the original and the revised SPF cumulative inflows to Addicks and Barker Reservoirs.

Addicks and Barker Reservoir capacities are smaller than the volume of the floodwater generated during the Harvey Event, but they effectively reduced peak flows downstream of the dams, as they were designed to do.

The combined capacity of Addicks and Barker Reservoirs is 210,500 acre-feet (68.6 billion gallons) of water within the Government Owned Land (GOL). This combined capacity is approximately 20% greater than the amount of floodwater generated under the pre-Harvey 100-year flood frequency. During the Harvey Event, at least 450,000 acre-feet of floodwater flowed into Addicks and Barker Reservoirs, significantly exceeding their combined capacity and dictating significant releases from the reservoirs.

The maximum combined discharge capacity of Addicks and Barker release conduits is approximately 16,000 cfs. During the Harvey Event, floodwater inflow rates to Addicks and Barker Reservoirs reached at least 160,000 cfs. Therefore, the maximum combined capacity of the release conduits was significantly exceeded. The difference in magnitude between the rapid inflow rates and the restricted outflow rates resulted in an initially rapid increase of water surface elevations behind the dams.

Despite the releases that were made during the Harvey Event, the reservoirs effectively reduced peak flows downstream of the dams, as they were designed to do.

Flooding was unavoidable during the Harvey Event

Flooding during the Harvey Event was unavoidable due to the following reasons:

- The total cumulative inflows to Addicks and Barker Reservoirs during the Harvey Event was more than twice the combined capacity of the reservoirs within the GOL.
- The maximum combined capacity of the release conduits could not discharge the excess volume of water during the Harvey Event. As such, upstream flooding was unavoidable.

- The Harvey Event exceeded the hydraulic design conditions of the Addicks and Barker Reservoirs, which required releases in accordance with the induced surcharge schedule. As such, downstream flooding was unavoidable.

Our modeling efforts showed that opening the gates entirely or, alternatively, never constructing the dams, would have resulted in much higher flooding to downstream properties, including the downstream Test Properties, than actually occurred. On the other hand, our modeling efforts showed that closing the gates entirely would have resulted in higher flooding and much longer flooding durations at upstream properties, including the upstream Test Properties, than actually occurred. We utilized a similar modeling approach in the upstream sub-case using the same model inputs used for the downstream sub-case. We summarize those results for the upstream Test Properties in Appendix C. The upstream modeling results demonstrate clearly that flooding during the Harvey Event was unavoidable.

Releases during the Harvey Event

There were three distinctive phases to the releases from Addicks and Barker Reservoirs during Hurricane Harvey. In the first phase the release was ramped up to a combined rate of approximately 6,000 cfs between 8/28/2017 1:00 and 8/28/2017 8:00. Between 8:00 on the 28th of August and 7:00 on the 29th there was only a small increase in the rate of combined release to 6,900 cfs. In the third phase, from 7:00 on the 29th until 15:00 that day, the release was once again ramped up to combined rate of approximately 13,000 cfs. The first and third phases, where the releases were ramped up, resulted in two distinctive flood waves moving down Buffalo Bayou below the dams.

The Addicks and Barker Dams have prevented devastating flooding of the downstream Test Properties and other downstream properties

Addicks and Barker Reservoirs stored at least 127 billion gallons of floodwater during the Harvey Event, without accounting for floodwater stored in detention ponds and tributaries above the reservoirs. This volume of floodwater was gradually released over a period of one month. Without these reservoirs, this floodwater would have been routed to areas downstream much more rapidly, causing more devastating flooding to all of the downstream Test Properties and other downstream areas, as compared to the flooding that actually occurred.

The federal project allows for the distribution of flood impacts across a wide area to minimize the chance of life-threatening conditions in any one area. Downstream of the dams, the federal project (and particularly the operation of the Addicks and Barker Dams) allowed for floodwater accumulated during the Harvey Event (a few days) to be distributed over a much longer period (a few weeks), which effectively reduced the depth of floodwaters downstream of the dams.

Our analysis showed that the downstream Test Properties would have experienced up to 8.6 feet more flooding without the federal project than they actually experienced. Under this scenario, this additional inundation without the federal project would have resulted in water depths of more than 10 to 15 feet above first finished floor elevations of the downstream Test Properties. The federal project prevented significant property damages and significantly reduced the risk of loss of life for downstream areas.

Effectiveness of lower Buffalo Bayou Rectification

Our analysis showed that the rectification of lower Buffalo Bayou downstream of the dams (i.e., Lower Langham Creek and the portion of Buffalo Bayou downstream of the dams, but upstream of Beltway 8) reduced flood durations on the downstream Test Properties by up to 2 days. Eight of the thirteen Test Properties are located along this rectified portion of Buffalo Bayou belonging to the following plaintiffs: Good

Resources LLC, Memorial SMC Investment 2013 LP, Arnold and Virginia Milton, Jennifer Shipos, Wayne and Peggy Hollis, Peter and Zhennia Silverman, Arnstein and Inga Godejords, and Paul and Dana Cutts.

Effectiveness of gate control

Our analysis demonstrated that first finished floors at downstream Test Properties would have been flooded by up to 3.7 feet more water if the Corps had kept the reservoir gates open during the Harvey Event, as compared to the flooding that actually occurred. In addition, our analysis showed that the downstream Test Properties would have experienced longer flooding than actually occurred if the Corps had kept the reservoir gates open during the Harvey Event.

The gated conduits at Addicks and Barker Dams effectively reduced flooding impacts downstream of the dams during the Harvey Event.

Repeated flooding below the dams caused by historical storms under the no-federal-project scenario

Our analysis showed that the downstream Test Properties would have repeatedly flooded during historical storms (dated 1975, 1994, 2001, 2009, 2015 and 2016) in the absence of the federal project. The existence and operation of the federal project prevented, or significantly reduced, flooding on the Test Properties during these events.

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Appendix A

Addicks and Barker Discharge Equations

A.1 Addicks and Barker Outlets

A.1.1 Introduction

The Addicks and Barker Reservoirs include controlled variable-height gates. Each reservoir outlet is equipped with five gated conduits (middle conduit includes 2 gates). Figures A-1 and A-2 show aerial views of Addicks and Barker outlets, respectively.



Figure A-1: Aerial view of the Addicks Reservoir gates. Source: Imagery ©2018 Google.



Figure A-2: Aerial view of the Barker Reservoir gates. Source: Imagery ©2018 Google.



Figure A-3: The Barker gate outlet channel showing 5 conduits. Source: Imagery ©2018 Google.

In both reservoirs, the upstream side of the outlet includes two water elevation sensors: a radar sensor and a pressure gage. These are used to report the headwater elevations for calculations. Also, in both reservoirs, the downstream side is characterized by an expanding channel with flow gages downstream of the outlet (approximately 250 m to 500 m downstream of the Barker and Addicks outlets, respectively).

A.1.2 Addicks Gate Gages

Addicks Gate has two gage stations: the upstream reservoir gage station (USGS 08073000) and the downstream reservoir gage station (USGS 08073100).

A.1.2.1 Upstream Reservoir Gage Station (USGS 08073000)

The upstream reservoir gage station contains instruments to measure the water elevation including a radar sensor and a pressure gage. The gages report the elevations in feet above NAVD88. The pressure gage is located in the “high orifice” as described on the USGS gage station website (USGS, 2018c). In addition to these measurements, the gage station reports the estimated reservoir storage volume.

A.1.2.2 Downstream Reservoir Gage Station (USGS 08073100)

The downstream reservoir gage station is a stage measurement station. During the Harvey Event, USGS measured discharges downstream of I-10, which is some 500 m downstream of the outlet.

A.1.3 Barker Gate Gages

Barker Gate has two gage stations: the upstream reservoir gage station (USGS 08072500) and the downstream reservoir gage station (USGS 08072600).

A.1.3.1 Upstream Reservoir Gage Station (USGS 08072500)

The upstream reservoir gage station contains instruments to measure the water elevation including a radar sensor and pressure gage. The gages report the elevations in feet above NAVD88. The pressure gage is located in the “high orifice” as described on the USGS gage station website (USGS, 2018a). In addition to these measurements, the gage station reports precipitation and the estimated reservoir storage volume.

A.1.3.2 Downstream Reservoir Gage Station (USGS 08072600)

The downstream reservoir gage station is a stage measurement station located at the downstream side of Highway 6.

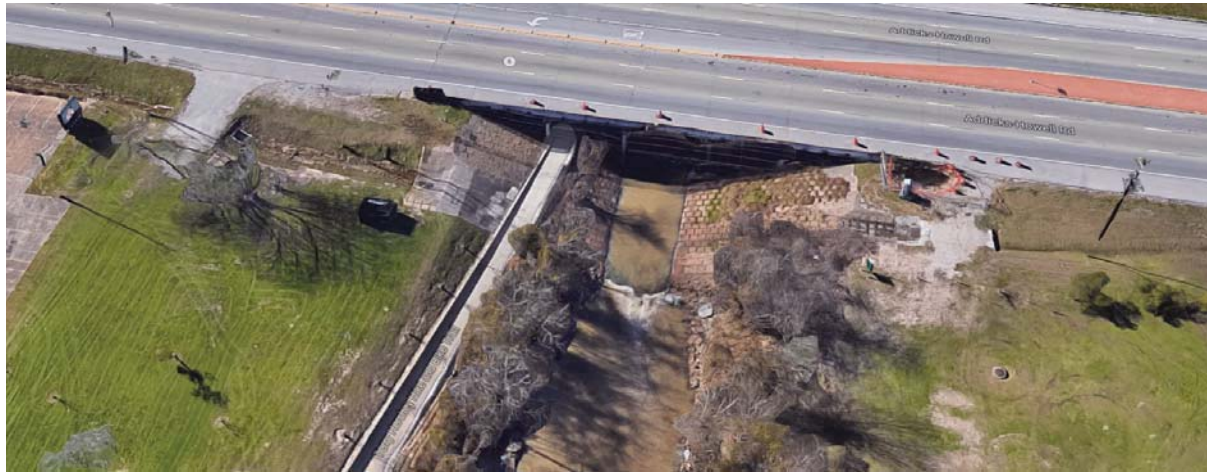


Figure A-4: Aerial view of the east side of Highway 6. Source: Google ©2018 Imagery.

A.1.4 Gate Operation Schedule

Information about gate operations was provided by the US Army Corps of Engineers (Corps) in the form of four spreadsheets. The spreadsheets describe the equations used to calculate flow through the gates depending on the tailwater and headwater conditions:

1. Addicks FY2017 Mornreports-1Hr.xlsm (unsubmerged and headwater submerged conditions) [19]
2. Barker FY2017 Mornreports-1Hr.xlsm (unsubmerged and headwater submerged conditions) [18]
3. ADDICKS RATING.xlsx (tailwater submerged conditions) [27]
4. BARKER RATING.xlsx (tailwater submerged conditions) [28]

In each spreadsheet, five gates are used to represent the array of gates in each reservoir. All quantities are in US Standard Units.

An hourly time series of the opening height of each gate is provided in spreadsheets 1 and 2. These time series were used as input into the TELEMAC model to compute flows through each gate.

A.2 Discharge Equations

The equations that calculate the flows through the gates are different for Addicks and for Barker. There are three flow conditions considered:

1. Unsubmerged Flow (no submergence of the headwater or the tailwater)
2. Headwater Submerged Flow (with no tailwater submergence)
3. Tailwater Submerged Flow (with headwater submergence and at partial tailwater submergence)

A.2.1 Addicks Flow Equations

A.2.1.1 Unsubmerged Flow

Equation 1 shows the formula used to calculate the flow rates through the gates during unsubmerged flow according to the 2012 Water Control Manual. The equation is in the form of a typical sharp-crested weir equation (Equation 14-9 in Chow, 1959 [50]) with a calibrated discharge coefficient.

$$Q = C_1 W_G (HW - H_{invert})^{\frac{3}{2}} \quad (1)$$

Where:

Q = Calculated flow rate through a single gate [cfs]

C_1 = Coefficient [-] (2.87)

HW = Headwater elevation [ft above NAVD88]

H_{invert} = Gate invert elevation [ft above NAVD88] (67.5)

W_G = Width of the single gate [ft] (8.0)

A.2.1.2 Headwater Submerged Flow

Equation 2 shows the formula used to calculate the flow rates through the gates during headwater submerged flow, according to the 2012 Water Control Manual. It is a variant of the typical orifice flow equation (Equation 6-42 in Henderson, 1966 [56]) with a calibrated set of discharge coefficients ($C_2/H_o C_3$).

$$Q = \frac{C_2 W_G H_o \sqrt{2g(HW - H_{invert})}}{H_o^{C_3}} \quad (2)$$

Where:

Q = Calculated flow rate through a single gate [cfs]

C_2 = Coefficient [-] (0.7292311)

C_3 = Coefficient [-] (0.07988726)

W_G = Width of the single gate [ft] (8.0)

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$$Q = \frac{C_2 W_G H_o \sqrt{2g(HW - H_{invert})}}{H_o^{C_3}} \quad (2)$$

H_o = Height of the gate opening [ft above invert] (0-6)

HW = Headwater elevation [ft above NAVD88]

H_{invert} = Gate invert elevation [ft above NAVD88] (67.5)

g = Gravitational constant [ft/s²] (32.2)

A.2.1.3 Tailwater Submerged Flow

Tailwater submerged flow occurs when the headwater is submerged and the tailwater reaches at least as high as 67% of the gate opening height. Equation 3 shows the submerged orifice equation, also a variation of the standard orifice equation, calibrated to the gates.

$$Q = W_G H_G \sqrt{\frac{2g(HW - TW)}{C_L}} \quad (3)$$

$$C_L = C_f + C_o + C_{entrance} + C_{exit} \quad (3a)$$

$$C_f = \frac{L_G}{\left(\frac{4W_G H_G}{2W_G + 2H_G}\right)} \quad (3b)$$

$$C_o = \text{fun}\left(\frac{H_o}{H_G}\right) \quad (3c)$$

Where:

Q = Calculated flow rate through a single gate [cfs]

C_L = Loss coefficient [-]

C_f = Friction loss coefficient [-]

C_o = Orifice loss coefficient [-] (See Lookup Tables)

$C_{entrance}$ = Entrance loss coefficient [-] (0.82)

C_{exit} = Exit loss coefficient [-] (1.0)

W_G = Width of the single gate [ft] (8.0)

L_G = Length of the conduit through the gate [ft] (252.0)

$$Q = W_G H_G \sqrt{\frac{2g(HW - TW)}{C_L}} \quad (3)$$

H_G = Maximum height of the gate opening [ft above invert] (6.0)

H_O = Height of the gate opening [ft above invert] (0-6)

HW = Headwater elevation [ft above NAVD88]

TW = Tailwater elevation [ft above NAVD88]

g = Gravitational constant [ft/s²] (32.2)

A.2.2 Barker Flow Equations

A.2.2.1 Unsubmerged Flow

Equation 1 with the following constants:

C_1 = Coefficient [-] (3.1)

H_{invert} = Gate invert elevation [ft above NAVD88] (70.2)

A.2.2.2 Headwater Submerged Flow

Equation 2 with the following constants:

C_2 = Coefficient [-] (0.7249552)

C_3 = Coefficient [-] (0.0898556)

W_G = Width of the single gate [ft] (9.0)

H_O = Height of the gate opening [ft above invert] [0-7]

H_{invert} = Gate invert elevation [ft above NAVD88] (70.2)

A.2.2.3 Tailwater Submerged Flow

Tailwater submerged flow occurs when the headwater is submerged and the tailwater reaches at least as high as 67% of the gate opening height. Equation 4 shows the standard form of the typical orifice flow equation with a calibrated discharge coefficient.

$$Q = C_D W_G H_O \sqrt{2g(HW - TW)} \quad (4)$$

$$C_D = fun(H_O) \quad (4a)$$

Where:

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$$Q = C_D W_G H_O \sqrt{2g(HW - TW)} \quad (4)$$

Q = Calculated flow rate through a single gate [cfs]

C_D = Discharge coefficient [-] (See Lookup Tables)

W_G = Width of the single gate [ft] (9.0)

H_O = Height of the gate opening [ft above invert] (0-7)

HW = Headwater elevation [ft above NAVD88]

TW = Tailwater elevation [ft above NAVD88]

g = Gravitational constant [ft/s²] (32.2)

A.2.3 Lookup Tables

Lookup Tables for the C_O and the C_D parameters were extracted from the spreadsheets provided by the Corps.

Table 12: Lookup Tables

Addicks Gate Opening Ratio [-]	Orifice Loss Coefficient C_O [-]	Barker Gate Opening Ratio [-]	Discharge Coefficient C_D [-]
0	140	0	0.7606
1/6	56.45	0.014285714	0.7536
2/6	10.335	0.028571429	0.7466
3/6	5.766	0.042857143	0.7396
4/6	2.52	0.057142857	0.7326
5/6	0.915	0.071428571	0.7256
6/6	0	0.085714286	0.7186
		0.1	0.7116
		0.114285714	0.7046
		0.128571429	0.6976
		0.142857143	0.6906
		0.157142857	0.68707
		0.171428571	0.68354
		0.185714286	0.68001

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Addicks Gate Opening Ratio [-]	Orifice Loss Coefficient C_o [-]	Barker Gate Opening Ratio [-]	Discharge Coefficient C_D [-]
		0.2	0.67648
		0.214285714	0.67295
		0.228571429	0.66942
		0.242857143	0.66589
		0.257142857	0.66236
		0.271428571	0.65883
		0.285714286	0.6553
		0.3	0.65354
		0.314285714	0.65178
		0.328571429	0.65002
		0.342857143	0.64826
		0.357142857	0.6465
		0.371428571	0.64474
		0.385714286	0.64298
		0.4	0.64122
		0.414285714	0.63946
		0.428571429	0.6377
		0.442857143	0.63689
		0.457142857	0.63608
		0.471428571	0.63527
		0.485714286	0.63446
		0.5	0.63365
		0.514285714	0.63284
		0.528571429	0.63203
		0.542857143	0.63122
		0.557142857	0.63041
		0.571428571	0.6296

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Addicks Gate Opening Ratio [-]	Orifice Loss Coefficient C_o [-]	Barker Gate Opening Ratio [-]	Discharge Coefficient C_D [-]
		0.585714286	0.62865
		0.6	0.6277
		0.614285714	0.62675
		0.628571429	0.6258
		0.642857143	0.62485
		0.657142857	0.6239
		0.671428571	0.62295
		0.685714286	0.622
		0.7	0.62105
		0.714285714	0.6201
		0.728571429	0.6196
		0.742857143	0.6191
		0.757142857	0.6186
		0.771428571	0.6181
		0.785714286	0.6176
		0.8	0.6171
		0.814285714	0.6166
		0.828571429	0.6161
		0.842857143	0.6156
		0.857142857	0.6151
		0.871428571	0.61495
		0.885714286	0.6148
		0.9	0.61465
		0.914285714	0.6145
		0.928571429	0.61435
		0.942857143	0.6142
		0.957142857	0.61405

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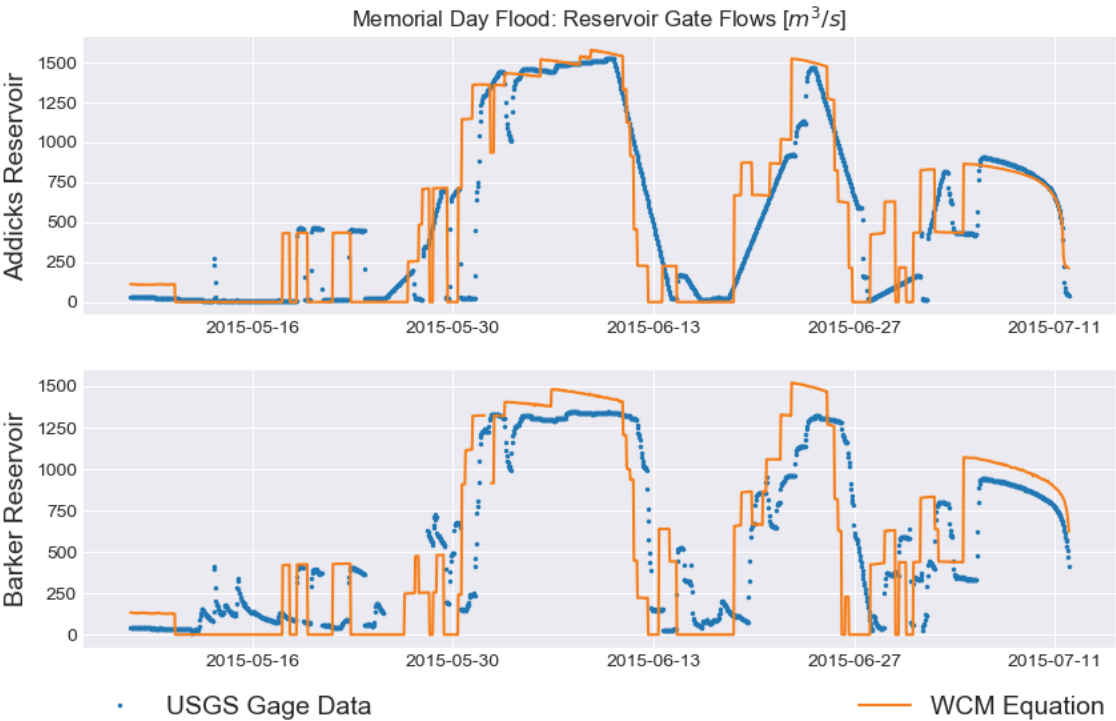
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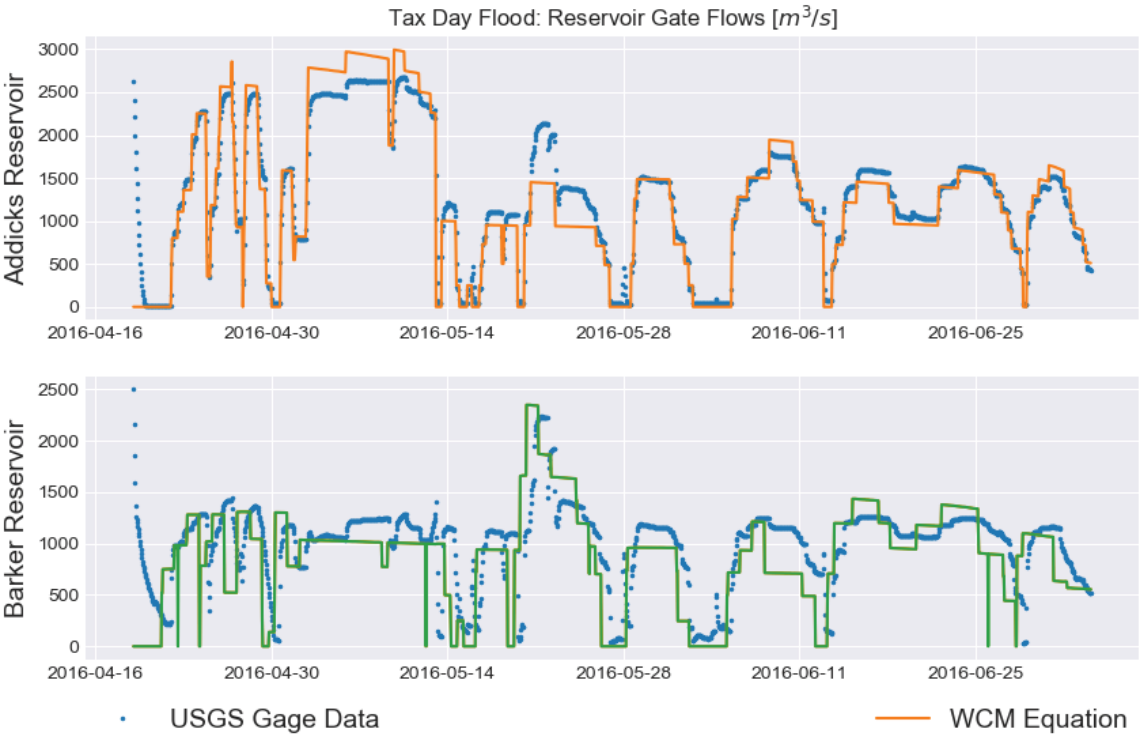
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Addicks Gate Opening Ratio [-]	Orifice Loss Coefficient C _o [-]	Barker Gate Opening Ratio [-]	Discharge Coefficient C _D [-]
		0.971428571	0.6139
		0.985714286	0.61375
		1	0.6136

A.2.4 Gate Flow Calculations

The 2012 WCM flow equation was tested for the Memorial Day (2015) and Tax Day (2016) floods, where no tailwater submergence occurred. The results are shown below.





Appendix B

Dr. Rob Nairn CV Expert Witness Experience and Compensation

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B.1 Dr. Rob Nairn CV

B.1.1 Profile

Dr. Nairn is a recognized river and coastal engineering expert with 35 years' experience on hydrodynamics, sediment transport and scour processes in watersheds, rivers, estuaries, lakes, coasts and oceans. Dr. Nairn is responsible for a range of coastal zone planning, management and engineering investigations, numerical and physical modelling and design projects. He is a Principal of Baird & Associates. Dr. Nairn has managed many of Baird's international projects in the Middle East, the Caribbean, Central and South America, Africa, Asia and Europe.

B.1.2 Education

- Ph.D. in Coastal Processes and Engineering Imperial College of Science, Technology and Medicine, London, England
- M.Sc. (Research) in Coastal Engineering, Queen's University, Kingston, Ontario
- B.Sc. First Class Honours in Civil Engineering, Queen's University, Kingston, Ontario

B.1.3 Professional Affiliations

- Registered Professional Engineer, Professional Engineers of Ontario (PEO)
- Associate Member, Canadian Society of Civil Engineering (CSCE)
- Associate Member, Ontario Society of Professional Engineers (OSPE)
- American Shore and Beach Preservation Association
- Canadian Coastal Science and Engineering Association
- Central Dredging Association (CEDA)

B.1.4 Experience

Mid Breton Sediment Diversion Southeast Louisiana (2018-present)

Dr. Nairn is the Hydraulic Engineering Lead on this project and Baird's senior technical reviewer. The project involves the design of a 35,000 cfs diversion from the Lower Mississippi River below New Orleans into Breton Sound. The diversion will bisect the river and back levee system to deliver sediment to restore wetlands and build land within Breton Sound. Dr. Nairn is leading Baird's efforts on the design of this \$650 million restoration project. Baird is applying a wide range of numerical models on the project to evaluate the performance of the diversion in terms of flow conveyance and sediment delivery and to support design development of the inlet, gates, conveyance channel and outfall. Baird's activities under Dr. Nairn's direction include planning of fieldwork and analysis of field data including ADCP data, LISST and turbidity data, water samples, bed samples and multi-beam surveys to evaluate flows, bed and suspended load transport. Dr. Nairn is also leading Baird's team in the application of a wide range of numerical models including HECRAS, MIKE21, FLOW3D, Delft3D, TELEMAC, ADCIRC and our in-house 3D model, MISED. The modelling also includes an evaluation of storm surge impacts from hurricanes on the Gulf Coast.

Lower Churchill River and Melville Lake Mercury Contamination Lower Churchill River, Newfoundland (2018)

Dr. Nairn is the Baird Senior Technical Advisor for this project to evaluate the impact of methyl mercury transport from the Lower Churchill Falls Dam reservoir into Goose Bay, Lake Melville and the North Atlantic. Dr. Nairn reviewed Baird's data analysis efforts in support of development of input and calibration data for their modelling. Baird modelling under the review of Dr. Nairn included watershed modelling and analysis for all of the watersheds to Goose Bay and Lake Melville and detailed Delft3D modelling of hydrodynamics, salinity, temperature and contaminant transport from the Lower Churchill River into the North Atlantic.

Harmful Algal Bloom Action Plans, New York State Lakes New York (2018-present)

Dr. Nairn is the Baird Senior Technical Advisor for this project to evaluate the cause of harmful algal blooms on 13 New York State lakes and to develop Action Plans for the rehabilitation of these lakes to reduce the risk of future algal blooms. The lakes included several Finger Lakes including Lake George and Lake Champlain. Dr. Nairn had overall responsibility for Baird's role in reviewing watershed, river and lake data on flows, sediment and nutrient transport into the thirteen lakes. A wide range of numerical models of watershed, river and lake processes for the thirteen lakes and their respective watersheds were reviewed. Baird also completed extensive remote sensing analysis of watershed and lake conditions including Chlorophyll a mapping to evaluate algal blooms on the lakes. Dr. Nairn coordinated Baird's contributions to action plans for restoration of the lakes and their respective watersheds to reduce the risk of future harmful algal blooms.

Flooding of New York City Buildings During Hurricane Sandy New York (2017-present)

Baird and Dr. Nairn have been retained to review numerical modelling of flood inundation associated with expert witness testimony for this confidential client. The modelling includes overland flow due to storm surge and flow into a series of interconnect basements over a City block. The review includes both an assessment of the model inputs, outputs and assumptions and comparison to data collected during the event. Under Dr. Nairn's direction Baird also completed independent modelling of the inundation of the buildings during Hurricane Sandy.

East Sandusky Bay Wetland Restoration Project and Sandusky Bay Restoration Plan Sandusky, Ohio (2017-present)

Dr. Nairn is the Baird Senior Technical Advisor for this project to restore wetlands to East Sandusky Bay. Baird are a subconsultant to this City of Sandusky project funded by the Ohio DNR. Baird's role includes characterization of the hydrologic, hydrodynamic and sedimentologic processes that are relevant to both the historic disappearance and restoration of the Putnam Marsh complex. Baird are undertaking field work, numerical model of the watershed and bay, contribution to concept development and development of design documents for the solution. Dr. Nairn was also the senior technical reviewer at Baird for a second project on Sandusky Bay involving the development of a strategic restoration plan for the Lower Sandusky River and Sandusky Bay involving the beneficial use of sediment to restore wetlands to the wide bay area to trap sediment and nutrients before they reach the western basin of Lake Erie.

Fox River PCB Contamination, Wisconsin Fox River, Wisconsin (2015-2017)

Dr. Nairn was retained as a rebuttal expert witness in this litigation involving PCB contamination of the Fox River. In this role Dr. Nairn reviewed previous reports on the modelling of hydrologic, hydrodynamic, sediment transport and contaminant transport processes over a 60-year period dating back the 1950s. Dr. Nairn also reviewed a wide range of data reports and analyses in support of the evaluation of PCB fate and transport. Dr. Nairn managed a team of scientists and modelers at Baird in the testing and simulation of fate and transport processes on the Fox River.

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Under Armour World Headquarters Baltimore Harbor, Maryland (2015-2017)

Dr. Nairn was the Baird Principal in Charge and senior technical reviewer for all hydrologic and coastal engineering related to the development of Under Armour's new 50-acre global headquarters at Port Covington in Baltimore Harbor, Maryland. The project included analysis and design of several new waterfront elements including a 1000 ft long marginal wharf, a 2000 ft long living shoreline, a 3-acre man-made lake, a new cooling water intake, and a bio-weir outfall structure. Baird was responsible for technical analyses to support design of all waterfront elements including assessment of flood risk due to hurricane generated storm surge, wave runup and overtopping, as well as potential future sea level rise. Baird provided recommendations for building first floor elevations, wharf deck elevations, and shore protection crest elevations. Baird was also responsible for the design of a cooling water system including modeling and compliance analyses of the intake structure, a three-acre manmade lake for initial cooling, and two thermal discharge structures.

Bayou Lafourche Pump Station and Diversion Donaldsonville, Lower Mississippi River (2016-present)

Dr. Nairn is the Baird Project Manager for this project to increase the pump station capacity that supplies water from the Mississippi River to Bayou Lafourche. Baird's role on the project consist of water and sediment management on the river and bayou sides of the project. Baird has coordinated field surveys including ADCP, turbidity gages, bed and water sediment sampling and bathymetry. A 3D hydrodynamic, sediment transport and morphologic model of the river was developed and applied and linked to a HECRAS model of the bayou to support evaluation of different alternatives for sediment and debris management in the river and on the bayou.

Javits Center Expansion – Flood Dynamics Modeling New York City (2016)

Dr. Nairn was the Baird Principal in Charge and senior technical reviewer on this project to investigate potential impacts of the proposed expansion of the Javits Center, located on 12th Avenue in New York City, on flood dynamics around its neighboring Lincoln Tunnel Ventilation Building. Baird was retained to assess the impact that the Center's new annex would have on flood levels at the ventilation building and conducted flood simulations to simulate overland flood flow at the site including inundations associated with the 10-, 50-, 100-, and 500-year flood events for both the existing and post-expansion conditions, the latter under various future sea level rise scenarios.

Changing Course Design Competition Possible Re-Alignment of the Lower Mississippi River (2014-2016)

In September 2014 Baird was selected as a winning team among 21 global competitors in the Changing Course Design Competition. Dr. Nairn was the Baird Team leader and of an inter-disciplinary team of 25 leading regional and national specialists (including areas of delta and barrier island geomorphology, sea level rise and subsidence, estuarine processes, wetlands/marsh building, fisheries, oysters, navigation, flood risk reduction and socio-economic factors) in the development of innovative solutions to the land loss problem in the Mississippi River delta associated with re-alignment of the river mouth. The team's work included a wide range of analysis including numerical modeling of river flooding, storm surge, hydrodynamics, estuarine salinity, sediment transport and delta building, and navigation simulations. Detailed reviews of marsh building and oyster reef restoration were also considered in the development of the solution.

Coastal Risk Assessment and Management Program Barbados (2015-2016)

Dr. Nairn was the lead technical reviewer of a sediment transport study to assess seal level rise impacts on beaches around Barbados as part of the Coastal Risk Assessment and Management Program. The study involved an island-wide assessment of underwater habitat conditions in relation to carbonate sediment production potential providing the natural supply of beach material. A multi component beach sediment budget prediction model was developed that formulates the

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balance between supply and loss of sediment for individual beaches under future sea level rise scenarios. The model will serve as a management tool for the Coastal Zone Management Unit to understand trends and risks, highlight key future issues/challenges, and support beach management actions over a planning horizon of 50 to 100 years.

La Pastora Riverbank Protection Puerto Moldanado, Peru (2015-2017)

Dr. Naim was the Principal in Charge and senior technical reviewer for Baird's design of this river bank protection project to protect a highway in Peru. Severe riverbank erosion was threatening a primary highway at a bend in the La Pastora River in Puerto Moldanado, Peru. Baird was responsible for design development on this \$30 million design-build project consisting of 12 steel sheet pile bendway weirs protecting 1.5 km of river bank, completed in 2017. Baird's activities under Dr. Naim's oversight included review of physical modeling of the protection system, management of field measurements of flows and bathymetric change and 3D numerical modeling of hydrodynamics, sediment transport and morphodynamics, all in support of design development.

Duqm Port Basin Channel Sedimentation Assessment Duqm, Oman (2015-2016)

Dr. Naim was the Principal in Charge and senior technical reviewer for this assessment of channel sedimentation at the new port of Duqm on the Indian Ocean. The project involves extensive fieldwork under the direction of Baird and hydrodynamic/morphologic numerical modeling of sedimentation processes.

Kalamazoo River Superfund Site Investigations Kalamazoo River, MI, USA (2014-2015)

Dr. Naim was the lead expert witness for the development and application of PCB Fate and Transport model including watershed, hydrodynamic, sediment transport/morphologic change and water quality components (with SWAT and Delft3D). The model was developed, calibrated and validated to develop a hindcast of conditions including discharges from fourteen paper mills for 80 miles of the Kalamazoo River between 1954 and 2014. Baird's work also included: field investigations of river hydrodynamics and bed sediment conditions.

Capers Ridge Pumping Station for the Luce Bayou Interbasin Transfer Project Trinity River, Texas (2012-2015)

Dr. Naim was the Principal-in-Charge and senior technical reviewer for Baird's role on this project to transfer water from the Trinity River westwards towards Houston in Texas. The Capers Ridge Pump Station of the Texas Coastal Water Authority features a 240 MGD capacity to transfer freshwater and goes to construction in 2016. Baird worked initially as a subcontractor to AECOM in the successful completion of the Environmental Impact Statement and more recently as a subcontractor in the Final Design stage to Dannenbaum/Black and Veatch. Baird completed detailed geomorphic analysis through site reconnaissance and GIS-based air photo analysis, in addition to 3D numerical modelling of river hydrodynamics, sediment transport and morphologic change to support the environmental impact assessment and final design and to evaluate potential impacts to flooding. Baird also supported the design of bank and toe protection for the intake.

Evaluation of Sediment Stability at a Superfund Site for National Grid Gowanus Canal, Brooklyn, NY, USA (2011-present)

Dr. Naim is the Principal in Charge and senior technical reviewer for an evaluation of sediment stability in an industrial canal in Brooklyn. Baird's work includes coordination of field work including bathymetry survey, erodibility sample acquisition and testing, ADCP measurements, sediment samples, and suspended sediment sampling. In support of this project Baird is also responsible for an evaluation of barge traffic and barge traffic impacts, numerical modeling of hydrodynamics, sediment transport and morphologic change using Delft3D.

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Pier IV Development for Vale Sao Luis, Brazil (2010-2016)

Dr. Naim was the Senior Technical Advisor for the evaluation of hydrodynamics sedimentation, scour and underwater slope stability issues associated with this \$1.7B iron export facility expansion by Vale in northern Brazil. Baird coordinated comprehensive field programs including bathymetry surveys, geophysical surveys, ADCP measurements, suspended sediment sampling, seabed sediment sampling and boreholes. Baird has completed extensive modeling of hydrodynamics, sediment transport and morphological change using our in-house model MISED to evaluate capital and maintenance dredging requirements for sediment traps and berthing areas for Valemax class vessels (400,000 DWT).

Harbour Improvements to address Sedimentation, Erosion and Wave Agitation Al Ashkarah and Quriyat Harbours, Oman (2012-2015)

Dr. Naim was the Baird Principal in Charge and senior technical reviewer for the evaluation of sedimentation, erosion and wave agitation problems and design of remedial measures at these two existing fishery harbours in Oman. Baird coordinated a comprehensive field program including bathymetry survey, meteorological monitoring, ADCP measurements of waves and currents, tide measurements, sediment sampling, jet probing and boreholes. This information is supporting numerical modeling of waves, currents, sediment transport and morphological change using our in-house model HYDROSED to understand the problem and develop solutions. Solutions were evaluated in a physical model. The selected solution for Quriyat consists of a 385 m extension of the south breakwater, with over 250,000 tonnes of stone and over 4,000 Accropode II™ concrete armor units (from 5.0 m³ units along the trunk and 7.5 m³ units at the head).

Rio Cruces Estuary, Evaluation of Large Scale Changes in Aquatic Vegetation Valdivia, Chile (2007-2012)

Dr. Naim was the Baird Project Manager for the evaluation of the disappearance of submerged aquatic vegetation and the sedimentation of this 40 km long estuary in Chile. The investigation included a comprehensive field investigation consisting of over 100 sediment cores, radionuclide dating, laser particle analysis, bio-indicator analysis and testing for metals; ADCP, turbidity, TSS and water level measurements. This field information was combined with a hydrodynamic and sediment transport model to investigate the role of point and non-point source loading on a nutrient and sediment balance of the estuary. Since the largest earthquake ever recorded caused 2 m of subsidence to create this estuary, the estuary has filled with sediment leading to rapid succession in vegetation communities.

Evaluation of Requirement for North Breakwater Port of Salalah, Oman (2012-2014)

Dr. Naim was the Project Manager for the evaluation mooring problems associated with this container terminal port in southern Oman. The primary problem relates to long waves (periods greater than 120s) and reflection of long waves from a beach into the port. Baird's assignment is to evaluate the need for a \$250 million north breakwater to prevent long waves from disrupting mooring operations in the port and to optimize the layout of the breakwater. Baird is also responsible for and EIA for the new breakwater. Tasks include bathymetry survey, extensive analysis of existing wave and ship motion data, numerical modeling of long waves using XBEACH and ship motion for various port layout alternatives. The EIA task includes an evaluation of water quality impacts of the proposed breakwater and erosion and sedimentation impacts of the breakwater.

Brice Lagoon Remediation Saudi Arabia (2012-2013)

Baird & Associates were retained to apply a hydrodynamic model (MIKE21) and develop design for the restoration of Brice Lagoon on the Gulf coast of Saudi Arabia. Dr. Naim was the Project Manager for this work. Baird completed fieldwork, GIS analysis and numerical modeling to develop the design to restore this coastal lagoon. Restoration included re-opening the lagoon to the sea, removal of oil and re-creation of tidal channels through the lagoon. The numerical model was used to

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evaluate the required opening for the gate structure at the inlet to the lagoon, in addition to the configuration and dimensions of internal tidal channels. This \$34 million restoration project was completed in 2013.

Yanbu Industrial Outfalls Saudi Arabia (2011-2013)

Baird & Associates were retained by local environmental consultants in Saudi Arabia to develop, test and implement a 3D hydrodynamic and water quality model to evaluate the expansion of industrial and domestic wastewater treatment plants (two separate projects) for the Industrial City of Yanbu on the Red Sea. Dr. Nairn was the Principal-in-Charge on this project for Baird. Work included model development, calibration/validation against existing data and modeling of future scenarios. The purpose of the work was to support Environmental Impact Assessments for the treatment plan expansions.

Port Hedland Outer Harbour Development Port Hedland, Western Australia (2010-2013)

Dr. Nairn was the Technical Director of sediment transport studies conducted in support of the design of a new offshore terminal for the export of iron ore. The vessels to be accommodated in the facility ranged in size from 150,000 to 250,000 DWT. Overall responsibilities included review of meteorological and oceanographic characterization; dredged basin layout; dredged depth design for a 32 km channel and basin; and estimates of maintenance dredging requirements. Baird applied our in-house model MISED to evaluate hydrodynamics, sediment transport and morphologic change and completed reviews of DELFT3D modeling by others.

Farim Phosphate Marine Terminal Development Guinea Bissau (2012-present)

Dr. Nairn is the Baird Principal in Charge and senior technical reviewer for the development of marine facilities options for this new mine development in Guinea Bissau, West Africa. Baird's work included development of design to provided bankable feasibility level cost estimates for capital and maintenance costs for all marine facilities and operations to export the mineral product. Tasks included coordination of comprehensive field programs including: bathymetry survey, geophysical survey, seabed sediment sampling ADCP measurements of waves and currents and tide measurements. Baird completed numerical modeling of hydrodynamics and sediment transport using our in-house model MISED. Baird developed design for an export pier and design for 100 to 200 km long channels including capital and operational cost estimates. Baird evaluated shipping options for export.

Cotonou Sea Defence Project Benin, West Africa (2000-2003, 2008-2012)

Dr. Nairn was the Project Manager for the completion of a Final Design Report, drawings, specifications, bill of quantities and an Environmental Assessment Report for this USD100 million sea defence project. The project consisted of eight large headland structures with over 600,000 tonnes of rock and almost 700,000 m³ of beachfill to protect 7 km of severely eroding shoreline. Another aspect of the project was addressing a 300,000 m³/year-sedimentation problem at the deep draft Port of Cotonou. Baird was responsible for all aspects of design on this Design-Build project. Investigations included topographic and hydrographic surveying, geotechnical and quarry investigations and numerical modeling of waves, currents, sand transport, sedimentation and shoreline change. In 2008, Baird & Associates were retained to take the lead role in developing tender documents for this project and to participate in the engineering services during construction.

Don River Mouth Restoration and Port Lands Flood Protection Toronto and Region Conservation Authority, Canada (2006-2015)

The naturalization of the Don River Mouth in downtown Toronto seeks to restore some of the natural functions of the river mouth at the same time as improving flood protection. Baird is a key part of the team undertaking the environmental assessment and functional design for naturalizing the Don and addressing flooding in the Port Lands. Baird's role is to

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assess the physical processes of sediment/debris transport and deposition under the existing conditions and for a series of proposed alternatives using Delft 3D. This assessment includes sediment trap analysis and evaluation of dredging options, assessment of sediment transport and deposition in different naturalized channel alternatives, and participation in the design and public consultation process. Dr. Nairn is the Baird Principal-in-charge for the sediment transport analysis and modelling, and an active participant in the Individual EA process.

Development of Watershed Based Sediment Transport Management Systems Detroit District US Army Corps of Engineers, (1999-2014)

Dr. Nairn was the Principal-in-Charge for the development and implementation of several watersheds based hydrologic, hydrodynamic and sediment transport modeling systems using GIS as a framework. Baird was responsible for developing, implementing and testing models for the Saginaw R. in Michigan, the Menomonee R. in Milwaukee, the Clinton River near Detroit and the Nemadji R. at Duluth. For these four watersheds Baird delivered final reports and user manuals and completed training workshops for local users of the systems. Under Dr. Nairn's direction Baird is developing similar systems on seven other watersheds, rivers and receiving waters in Michigan and Ohio. Baird's overall fees on these projects exceed USD2.5 million.

Jeddah Region Coastal Water and Sediment Quality Assessment and Remediation Project Jeddah, Saudi Arabia (2007-2011)

Dr. Nairn was the Baird Project Manager for this comprehensive assessment of water and sediment quality along a 75 km reach of Red Sea coast centered on Jeddah. The investigations included water and sediment quality sampling, hydrographic surveys, measurements of waves and currents, use of bio-indicators and stable isotope analysis, 3D numerical modeling of hydrodynamics and sediment transport, and evaluation of remedial alternatives. A plan for the implementation of remedial measures was developed.

Evaluation of Harbor Impacts on Downdrift Shoreline Erosion St. Joseph Harbor, Lake Michigan, USA (2004-2011)

Dr. Nairn was the Project Manager for this comprehensive assessment of the impacts of St. Joseph Harbor on adjacent shoreline erosion processes. The work was completed to develop expert witness testimony for a trial in the Federal Court of Claims in the USA. Dr. Nairn was the lead technical expert in both the 2007 and 2011 trials for the US Dept. of Justice. Baird's work included a thorough investigation of the history of erosion processes since harbour construction in 1836. Specific tasks included shoreline change analysis (accretion in the fillet beaches and erosion of adjacent shores) using GIS, evaluation of navigation channel dredging, evaluation of the beach nourishment mitigation program, numerical modeling of changes to watershed supply of sediment, numerical modeling of wave climate, wave transformation, hydrodynamic, longshore sediment transport and harbor bypassing, consideration of cohesive and sandy shore erosion processes and development of a comprehensive sediment budget for several periods between 1836 and present.

St. Clair River Investigation Great Lakes Basin (2004-2011)

Dr. Nairn was the Principal-in-Charge for this assessment of reduction in head difference between Lakes Huron-Michigan and Lake St. Clair/Erie. The project discovered an ongoing drop in the base level of Lakes Michigan-Huron and found that this was primarily explained by erosion of the riverbed of the upper St. Clair River. The project involved numerical modeling, GIS analysis from Lake Huron through to Lake Erie.

Breakwater Damage and Repair Assessment Sohar Industrial Port Complex, Oman (2011-2012)

Dr. Nairn was the project manager for a comprehensive assessment of cyclone damage to 6 km of breakwaters protecting a large port in Oman. The study included detailed, high resolution laser and multibeam sonar surveys of the above and below

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water portions of the breakwater, assessment/quantification of damage to the armour layer caused by a tropical cyclone, and preliminary design development for remedial works. Dr. Nairn managed the study team during the planning and implementation of the field study, and throughout the data reduction/analysis phase.

Sedimentation Assessment for a new Port in Guinea Guinea, West Africa (2007-2008)

Dr. Nairn was the internal technical director of numerical modeling of sediment transport and channel sedimentation processes for this new deep draft port and proposed 25 km long navigation channel. The project including coordination of field investigations to measure waves and currents and direct fieldwork to retrieve cores, sea bed sediment samples and suspended sediment samples. The numerical modeling consisted of the application of a hydrodynamic, sediment transport and morphologic model to predict short and long-term sedimentation along the full length of this channel the extends from offshore into the estuary of two large rivers.

IJC Lake Ontario and St. Lawrence River Review of Regulation Plans International Joint Commission, Lake Ontario (2001-2005)

Dr. Nairn was the Baird Principal-in-charge for a lakewide assessment of erosion and flooding hazards and impacts to support the current International Joint Commission review of regulation plans for controlling the outflow from Lake Ontario. This 3-year project involved data collection, numerical modeling, economic and GIS analysis on a lakewide scale covering thousands of kilometers to determine impacts of different lake level regulation plans over a 50-year planning horizon. Baird developed customized software, integrating erosion and flood prediction models with economic damage models within a GIS framework, to complete this task.

Morphodynamics of Dredged Pits – Biological and Physical Impacts Gulf of Mexico, US Minerals Management Service (2005-2009)

Dr. Nairn was the Project Manager for the assessment of infilling of dredged pits along the Gulf of Mexico and Atlantic coasts of the USA. Coastal restoration projects associated with long-term plans and in response to the damage associated with Hurricanes Rita and Katrina require a source of beachfill quality sediment. The purpose of this study is to evaluate pit morphology (pit infilling and pit margin erosion) and the associated biological and physical impacts. The study includes field surveys of an existing pit (sediment samples and cores, benthos sampling, ADCP measurements, hydrographic survey, water quality measurements including temperature, salinity and suspended sediment) and 3D numerical modeling of pit infilling with time. The study resulted in guidelines for the regulation and management of sand and gravel resources along the US coast.

Barbados Coastal Infrastructure Project Barbados, West Indies (2002-2011)

Dr. Nairn was the project manager for the design phase of one of the largest of eight waterfront rehabilitation projects Baird designed. The award winning USD8 million Rockley Beach project consists of beach restoration through the construction of natural headlands and beach nourishment to improve coastal resilience and public access. In addition, Dr. Nairn provides technical advice to the Coastal Zone Management Unit in Barbados on an ongoing basis related to the linkage between point and non-point source (water/ground watershed), marine water quality, reef health and the link to long-term beach stability. These various studies were based on extensive field investigations, numerical modeling of waves (including hurricanes), surge, currents and sand transport.

Port D'Ehoala, Fort Dauphin Madagascar (2003-2010, 2011-2015)

Dr. Nairn provided Quality Control of sediment transport studies of the new \$150 million port project designed by Baird. The port is located at the south end of Fausse Baie des Galions, which is a large embayment between two natural headlands

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under the action of bi-directional swell and sea waves. Major project components include two berths, dredging and reclamation, berm breakwater, groynes, navigation channel, and quarry development. GIS analysis of historic shorelines and extensive 2D numerical analysis of waves, currents and sediment transport of the bay with and without the port in place were conducted to determine sedimentation rates and countermeasures as well as the effect of port construction on the shape of the bay. Dr. Nairn has been served as a senior technical reviewer of the erosion and sedimentation from Baird's monitoring on the project.

Source Water Protection Initiative, Province of Ontario Ontario, Canada (2006-2011)

Dr. Nairn was the Principal-in-Charge at Baird on seven different projects with over \$1.2M in fees to evaluate the vulnerability of surface water intakes to contamination. The work involves development and application of policy for evaluation of surface water intakes. Numerical modeling has been completed for over 60 surface water intakes to determine the threats and vulnerability from various pollutant sources including rivers, wastewater treatment plant outfalls and spills at ports and harbours.

Cat Island Chain Restoration Green Bay, WI (2003-2013)

Dr. Nairn was the project manager for the conceptual and preliminary design phases of this \$15 million USACE award winning Great Lakes Restoration Initiative project that was completed in 2013. The project consisted of restoring the 270 acre Cat Island chain and creating conditions for the recovery of the 1,400 acre Duck Creek wetland. The innovative approach consisted of creating a skeleton of the Cat Island chain which will be filled through beneficial use of 2 million cubic yards of dredged sediment from the Green Bay navigation channel over the next 20 years. The project featured over 23,000 ft of rubblemound structure comprised of more than 650,000 tons of stone. Tasks included field investigations, numerical and physical modeling of waves and currents, overtopping, sediment plumes and evaluation of historic dredging and sedimentation, achieving survival criteria for aquatic vegetation and natural island design with living shorelines.

Keta Sea Defence Project, Ghana West Africa (1996-2004)

Dr. Nairn was the study manager for the development of an \$80 million sea defence system to protect 7 km of rapidly eroding coastline. The design included seven large headlands (each constructed with approximately 70,000 t of rock), 2,600,000 m³ of beach nourishment and a flood relief structure. Field investigations included boreholes, vibracores, augers, topographic and hydrographic surveys and wave gauge deployment. Design analyses included the application of numerical models of wave transformation, coastal processes, shoreline change, and the completion of physical model tests. The numerical models were applied to simulate wave setup and runup that resulted in severe flooding and overtopping of the barrier island that protects Keta Lagoon. Baird's engineering fees during both design and construction phases of the project totaled \$4,500,000. Construction on the project started in January 2000 and was completed in 2004, on budget and ahead of schedule.

Flood Hazard Review for FEMA Collier County, Florida (2002)

Dr. Nairn managed Baird's input to a review of the hurricane flood zone mapping for Collier County in Florida. Baird was specifically retained by FEMA to determine whether analyses completed to support re-mapping of the flood zone correctly considered the combined influence of storm surge and wave setup along the Collier County coast.

Lake Michigan Potential Damages Study - U.S. Army Corps of Engineers Lake Michigan (1996-2002)

Dr. Nairn was the Baird Principal-in-charge for a six year Corps of Engineers' project to develop a Flood and Erosion Prediction System (FEPS) to quantify flooding, erosion and sediment transport processes, initially along the entire 2400 km coast of Lake Michigan and eventually all the Great Lakes. The FEPS links wave analysis, the COSMOS coastal process model and sediment budget routines to a GIS system (for the purposes of pre and post processing) and provides a valuable coastal zone management tool to assess potential erosion and flooding damages and for planning purposes. The system also provides a regional sand management tool to assess the impact of various forms of waterfront development on sand supply and sedimentation issues. The FEPS is also being applied to Lakes Ontario and Erie.

Elbow Cay – Flood and Erosion Vulnerability Assessment Abaco, Bahamas (1999-2000, 2004-2005)

Dr. Nairn was the study manager for this investigation of flood and erosion processes along the shoreline of Elbow Cay. The investigation was initiated to assess damage caused by Hurricane Floyd and to develop recommendations for remedial measures. Numerical models were applied to assess deepwater and nearshore wave conditions, storm surge, wave generated currents, wave setup, runup and overwash and erosion of the dune face. The predictions were verified with observations of flooding and erosion during Hurricane Floyd. Vulnerability of the shoreline to future hurricanes is presented through direct links between the models and GIS. A follow-up study was completed to assess the impact of Hurricanes Jeanne and Frances in 2004 and to refine the proposed protection options.

Hudson River PCB Assessment New York (2000-2001)

Dr. Nairn was selected to provide expert review on the hydrodynamic and sediment transport aspects of the Baseline Modeling Report completed for the Environmental Protection Agency.

Modeling of Fate and Transport of PCB Contaminated Sediments on the Fox River, WI Wisconsin (1998-2001)

Dr. Nairn was the project manager for the development of a 2D/3D hydrodynamic, fate and transport model to assess resuspension potential for PCB contaminated sediments for the Fox River RI/FS. The project included assessment of the resuspension characteristics of fine sediments using the results of field and laboratory methods. Dr. Nairn also managed the application of GIS to develop 3D maps of contaminant concentration and to display predicted resuspension patterns for remedial alternatives.

Lower Great Lakes Flood and Erosion Study Lake Erie and Ontario (1999-2001)

In 1998, the Buffalo District U.S. Army Corps of Engineers initiated a comprehensive investigation on the US shoreline of Lake Erie and Ontario. Dr. Nairn was the Principal-in-charge on this project that included the application of the Flood and Erosion Prediction System (FEPS) to counties in Ohio and New York State. The FEPS is a custom modeling system developed by Baird to evaluate regional coastal processes, predict long term erosion, impacts of coastal structures (such as harbors), and assessments of regional sediment management.

Sheboygan River, WI (2001-2003, 2005-2006)

Dr. Nairn was the project manager for the 3D numerical model investigation of hydrodynamics and sediment transport on the Sheboygan River to investigate the potential mobilization of PCB bearing sediment. The project was completed for the US Army Corps of Engineers on behalf of EPA. The work included model selection and testing, laboratory experiments to assess erodibility of relatively undisturbed core samples, data gap analysis and subsequent field work and turn over of the modeling system to the client.

Addicks and Barker Flood Control Reservoirs - Downstream Hydraulic Study

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B.1.5 Technical Papers

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Kamphuis, J.W., Davies, M.H., Nairn, R.B., and Sayao, O.J. (1986) "Calculation of Littoral Sand Transport Rate." Coastal Engineering, Vol. 10, 1-21. Amsterdam. 1986.

Kamphuis, J.W. and Nairn, R.B. (1984) "Scale Effects in Large Coastal Mobile Bed Models." Proc. of the 19th International Conference on Coastal Engineering, Houston, 1984.

B.1.6 Awards

- Gold Medal in Civil Engineering, 1982 - Queen's University, Kingston, Ontario
- Queen's University Jenkins Trophy for athletic and scholastic achievement
- Unwin Postgraduate Prize in Civil Engineering - Imperial College of Science, Technology and Medicine, London, England

B.2 Previous Expert Witness Experience & Compensation

B.2.1 Previous Expert Witness Experience

Muskegon Conservation Club v. Consumers Energy Co., No. 01-40632 (Michigan 14th Circuit Court) (for Consumers Muskegon River – expert report, deposition and trial testimony)

Banks et al. v. USA, No. No. 99-4451 (Fed. Cl.) – liability phase (for DOJ, expert report at least one deposition and trial testimony)

Banks et al. v. USA, No. No. 99-4451 (Fed. Cl.) – damages phase (for DOJ, three or four expert reports at least one deposition and trial testimony)

Georgia-Pacific Consumer Products LP, et al. v. NCR Corp., et al. No. 11-CV-483 (W.D. Mich.) (Kalamazoo River for NCR – expert report, deposition and trial testimony)

Appvion Inc. and NCR Corp. v. P.H. Glatfelter Co. et al. (Fox River for NCR – expert report and deposition, settlement reached before trial, therefore no testimony)

B.2.2 Compensation

The compensation rate for Dr. Nairn is \$302/hour.

Appendix C

Results of Upstream Hydraulic Study

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Expert Report of Dr. R. Nairn (Downstream)

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C.1 Summary of Results at Upstream Test Plaintiffs

A summary of the results of the upstream hydraulic study at the upstream Test Properties is presented below in Tables C.1. The upstream hydraulic study included the following model scenarios:

- Actual Harvey Run: Representing actual Harvey-Event conditions upstream and downstream of the dams. Refer to Figures C.1 to C.14.
- No Project Run: Representing hypothetical conditions without the dams and channel improvements within the GOL. Refer to Figures C.15 to C.28.
- Gates Closed Run: Representing actual Harvey Event conditions upstream and downstream of the dams under the hypothetical no reservoir release scenario.
- Gates Open Run: Representing actual Harvey Event conditions upstream and downstream of the dams under the hypothetical gates fully open (maximum release) scenario.

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Table C.1: Summary of model run results for upstream Test Plaintiffs

Plaintiff	Maximum depth of inundation above FFE (ft)				Duration (hr)			
	Actual Harvey	No Project	Gates Closed	Gates Open	Actual Harvey	No Project	Gates Closed	Gates Open
Lakes on Eldridge	0.5	-	1.1	-	33	-	227	-
Wind, Kurt & Jean	0.2	-	0.9	-	22	-	158	-
Mitchell, Stewart	0.4	-	1.1	-	30	-	206	-
West Houston Airport Corp.	0.8	-	1.5	-	50	-	371	-
Mitchell, Mario	1.8	1.8	1.8	1.8	37	39	37	38
Burnham, Elizabeth	3.9	1.1	4.5	2.3	163	31	> 427	113
Sidhu, Kulwant	2.3	-	3.0	0.7	108	-	> 418	49
Turney, Robert	4.8	-	5.4	3.2	186	-	> 426	132
Holland, Scott	1.6	-	2.2	0.02	82	-	> 415	6
Popovici, Catherine*	0.6	-	1.7	-	42	-	> 405	-
Soares, Elisio	1.7	-	2.9	-	87	-	> 414	-
Micu, Christina	3.0	0.9	4.2	0.9	142	18	> 429	67
Giron, Juan & Ann	1.8	1.4	2.9	1.4	117	21	> 441	20
Banker, Todd & Christina	2.1	-	3.2	-	101	-	> 417	-

* According to Plaintiff's deposition [55, p. BAIRD0000346] there was no flooding above the FFE.

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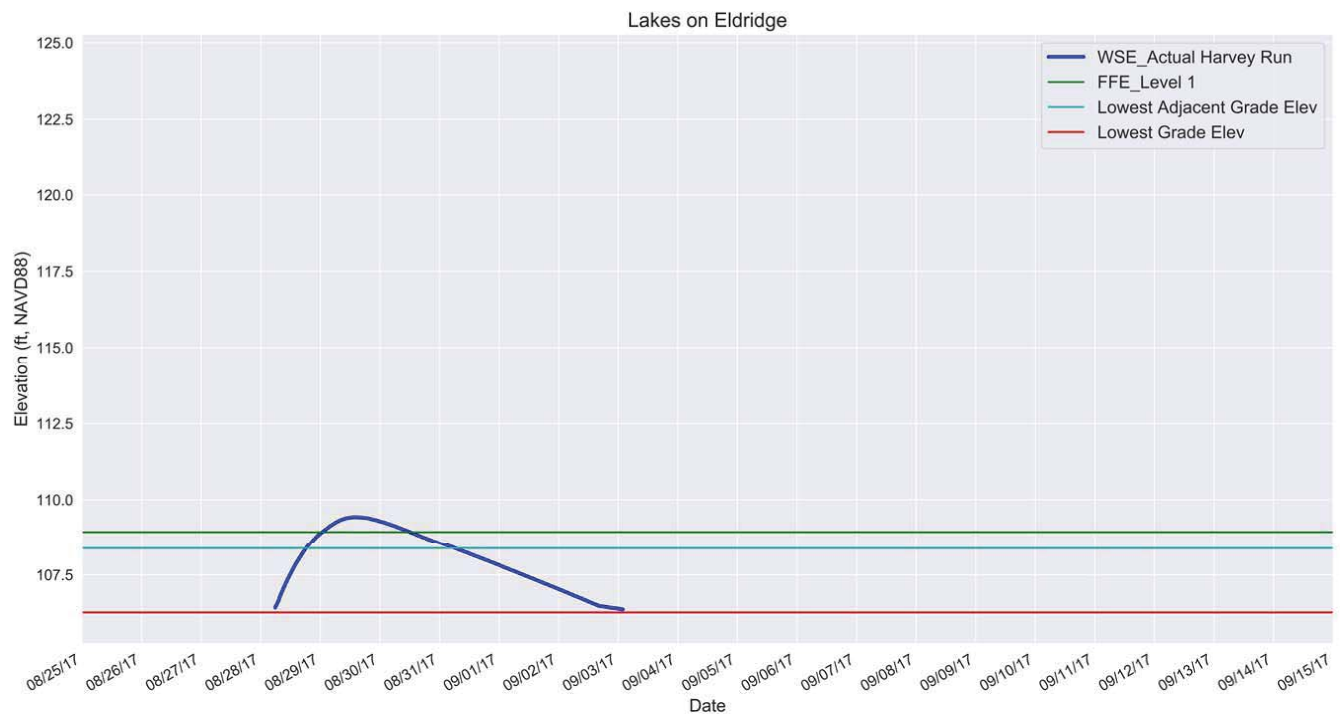


Figure C.1: Simulated water surface elevations at Lakes on Eldridge (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
109.4	N/A	5.9"	3" - 4"

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Expert Report of Dr. R. Naim (Downstream)

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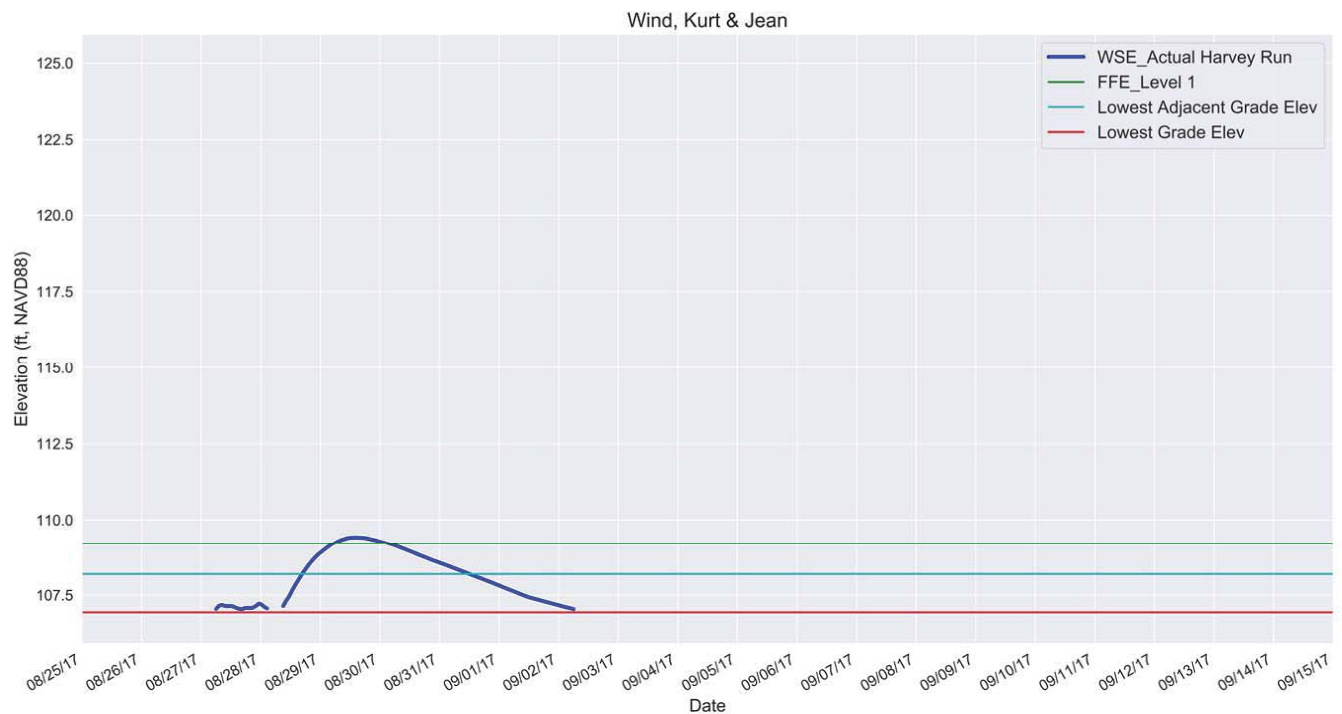


Figure C.2: Simulated water surface elevations at the property of Wind, Kurt & Jean (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
109.4	N/A	2.7"	4" - 6" in house and 1 ft in garage

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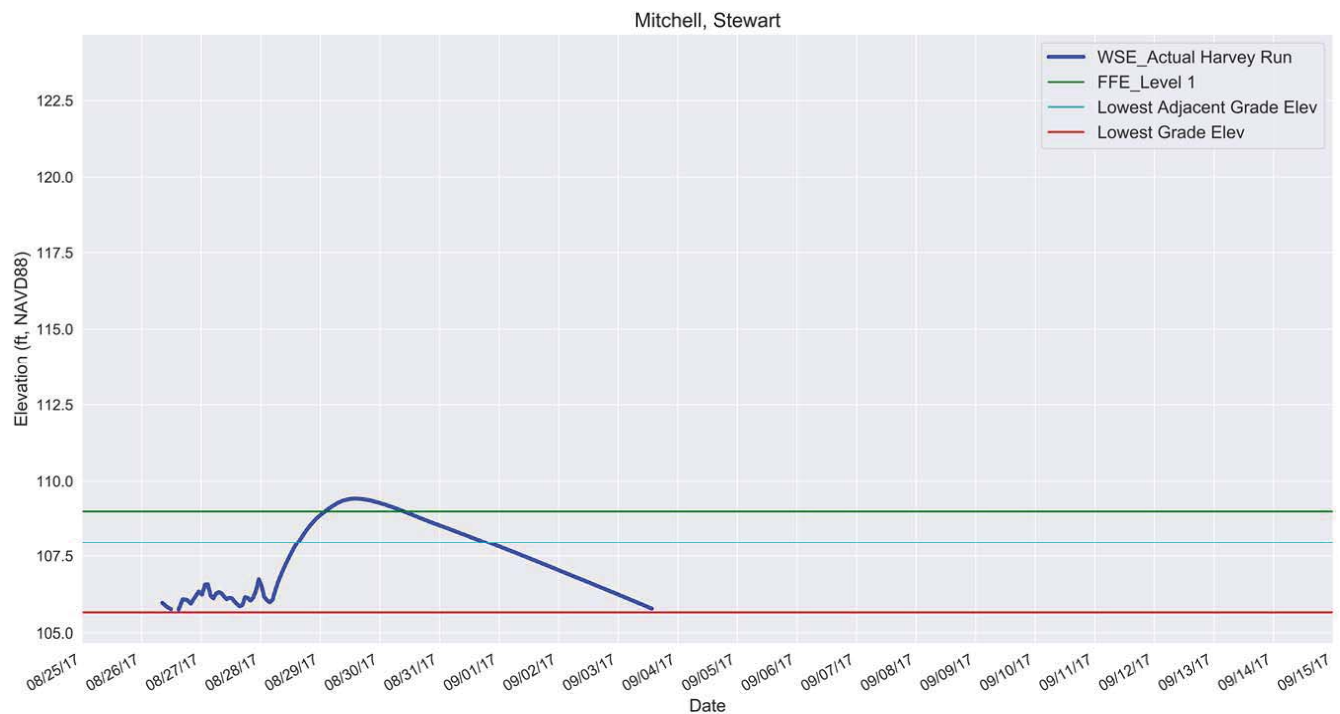


Figure C.3: Simulated water surface elevations at the property of Mitchell, Stewart (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
109.4	109.7	5"	6"

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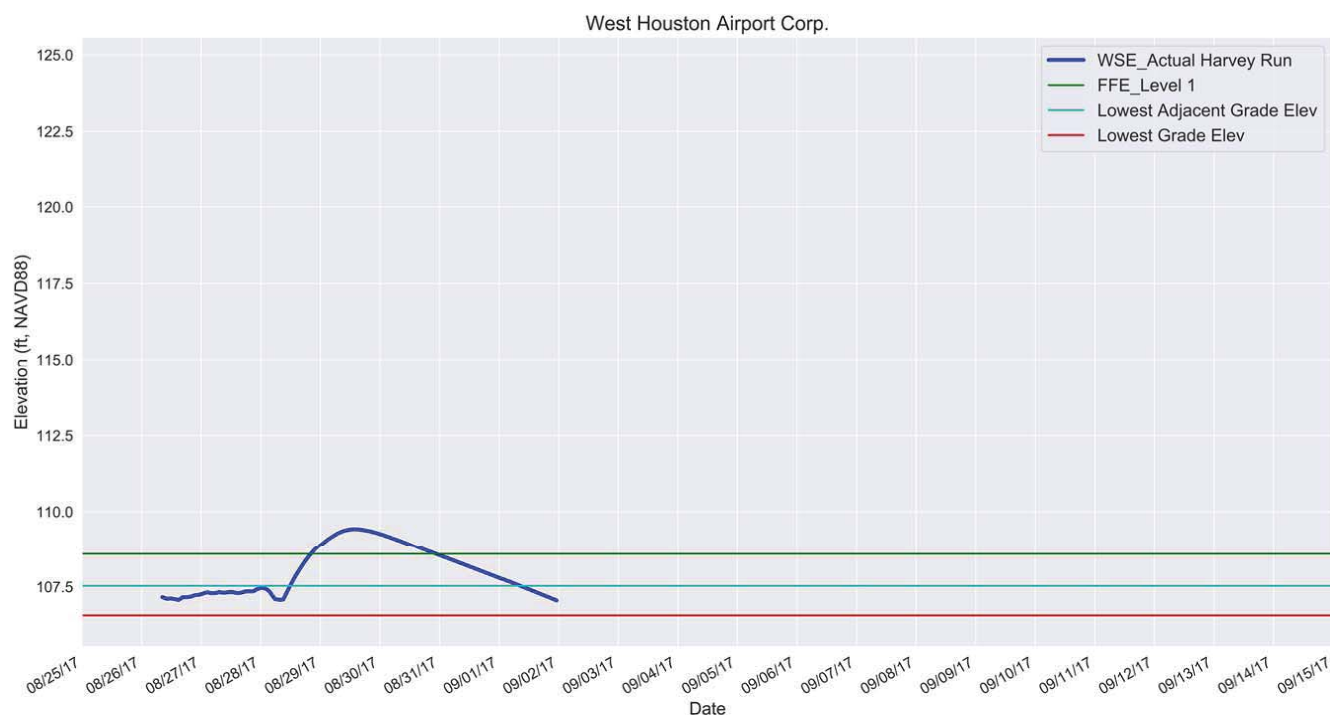


Figure C.4: Simulated water surface elevations at West Houston Airport Corp. (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
109.4	109.7 / 109.8	10.1"	5" - 8"

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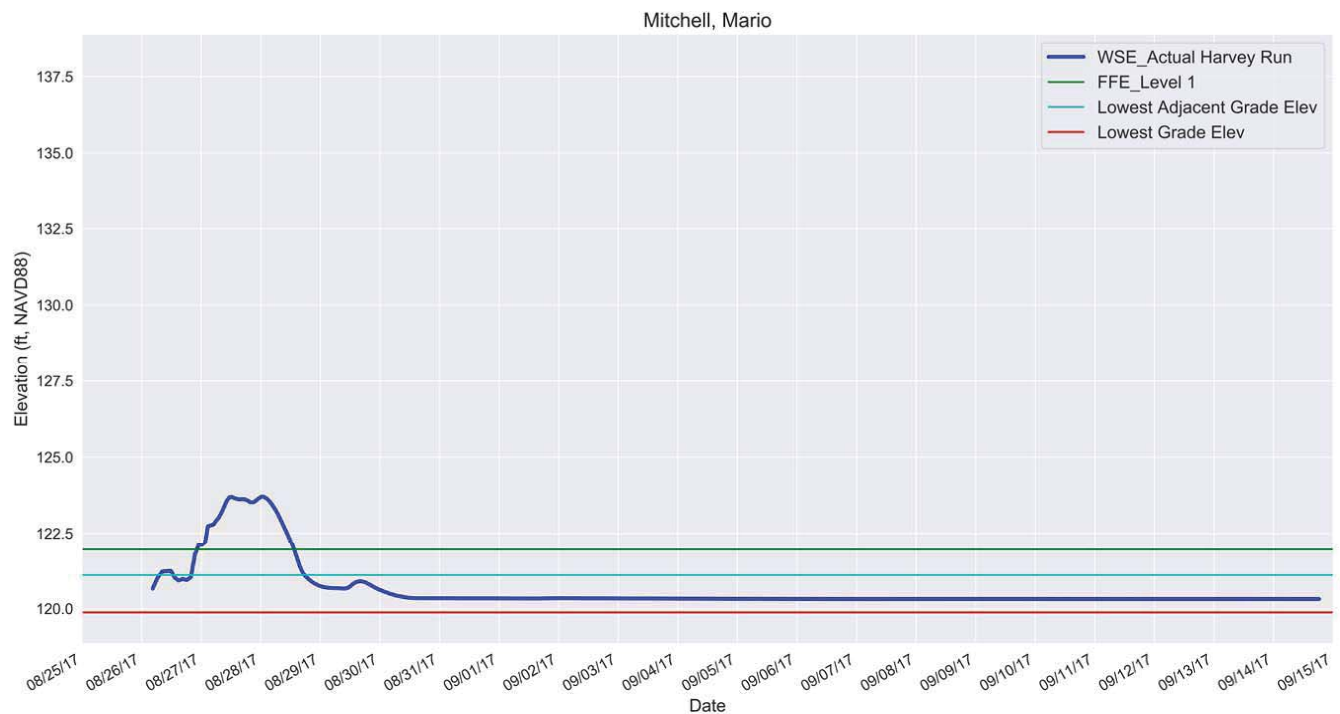


Figure C.5: Simulated water surface elevations at the property of Mitchell, Mario (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
123.7	N/A	21.3"	No longer a Test Plaintiff

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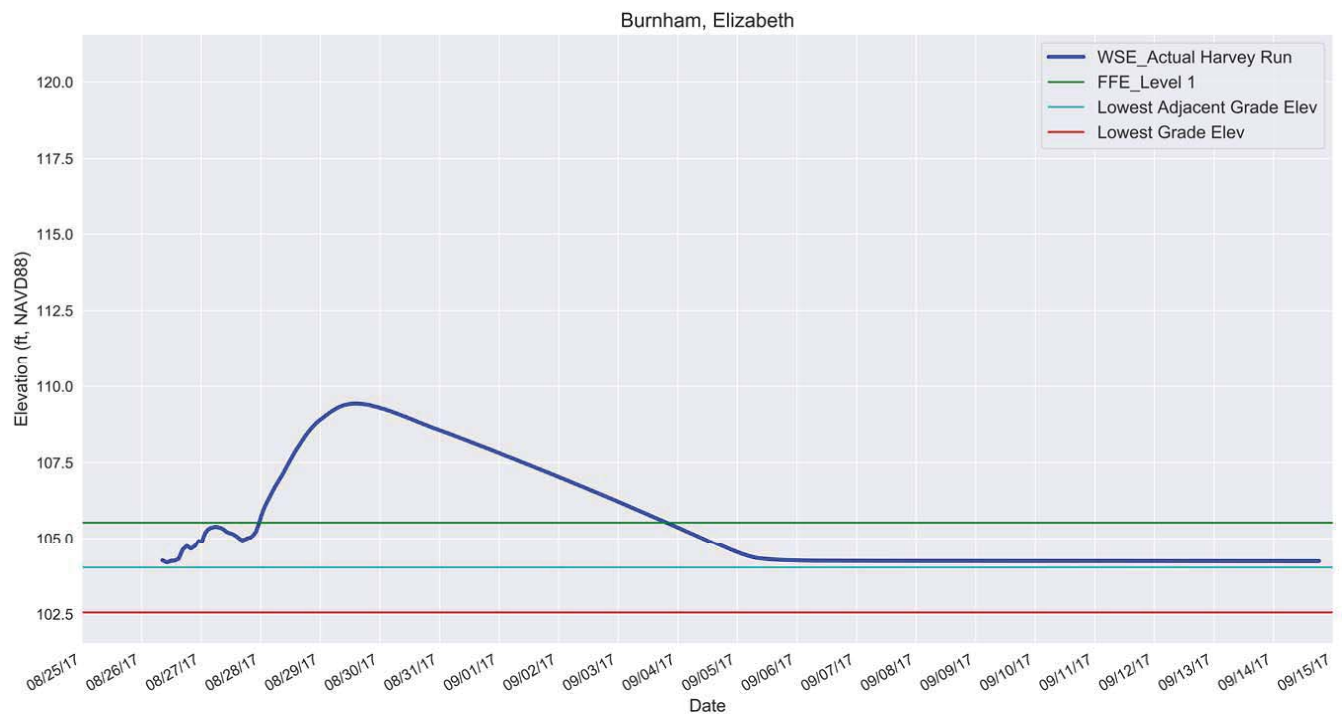


Figure C.6: Simulated water surface elevations at the property of Burnham, Elizabeth (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
109.4	109.9 / 111.8	3.9 ft	Unsure because Plaintiff had evacuated.

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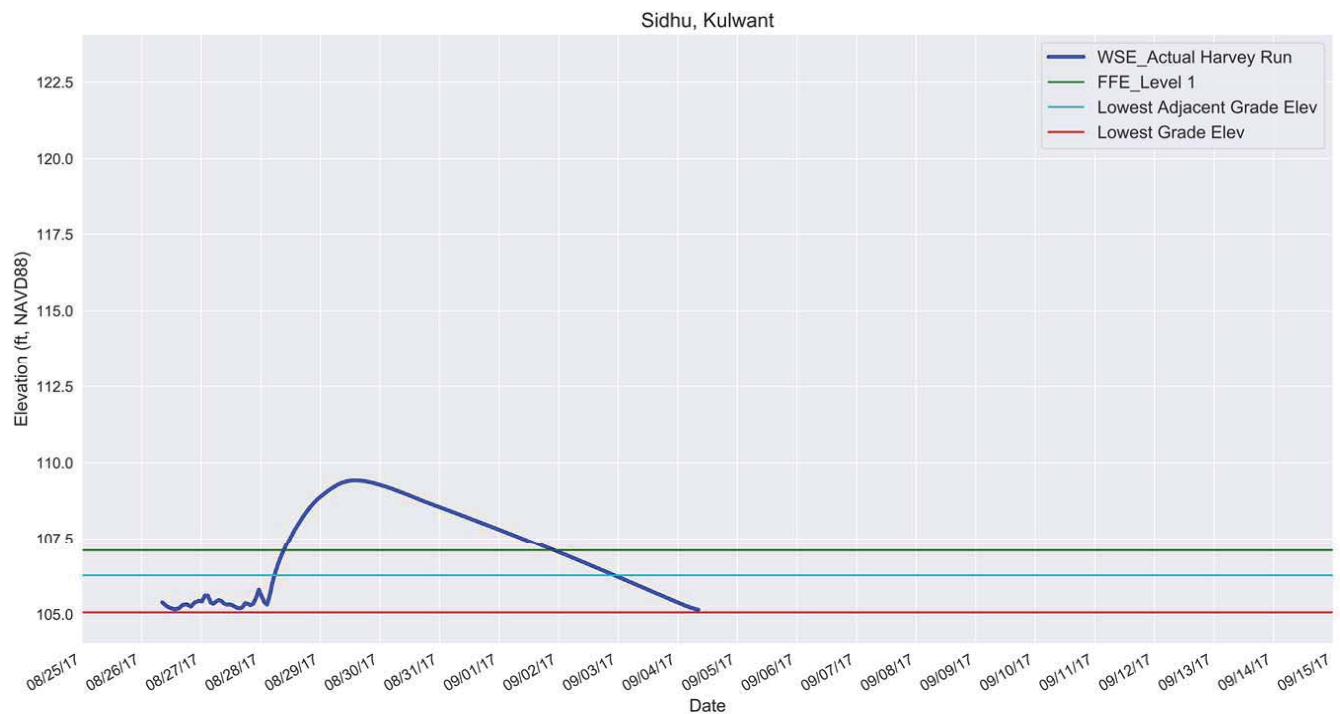


Figure C.7: Simulated water surface elevations at the property of Sidhu, Kulwant (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
109.4	N/A	2.3 ft	3 ft

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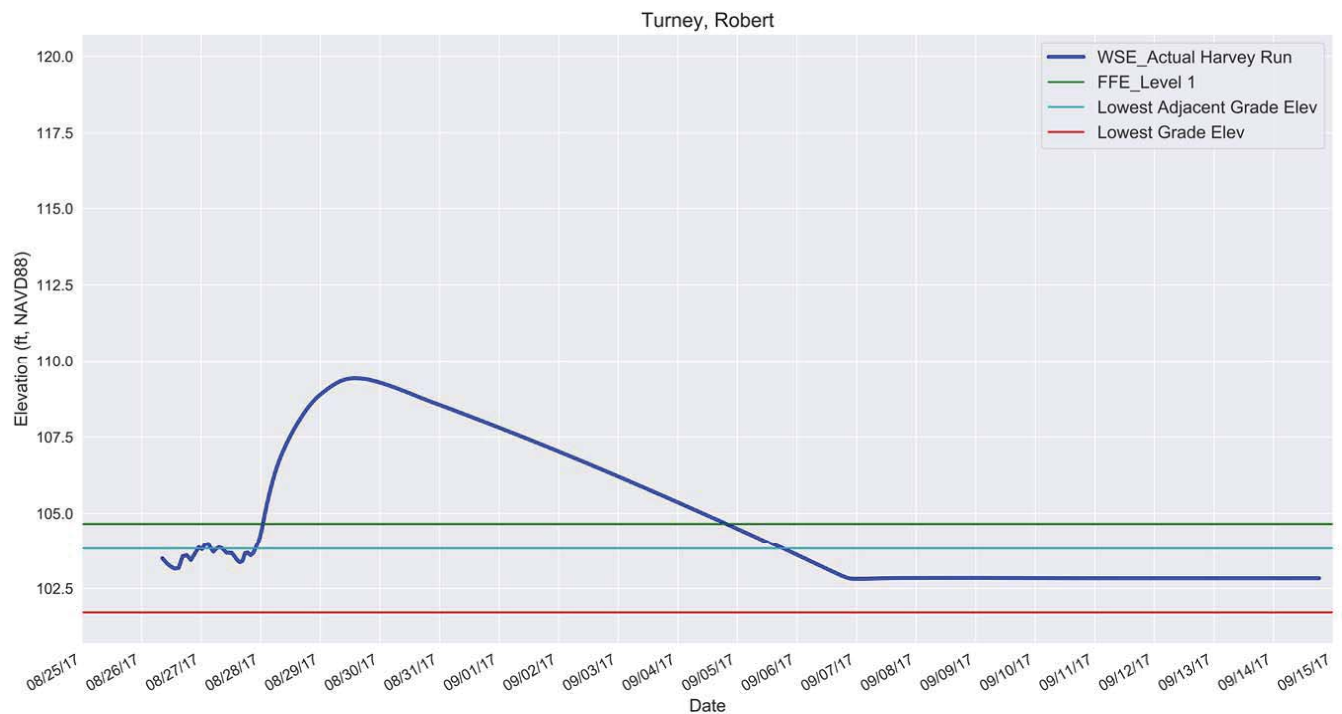


Figure C.8: Simulated water surface elevations at the property of Turney, Robert (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
109.4	109.4	4.8 ft	5 ft

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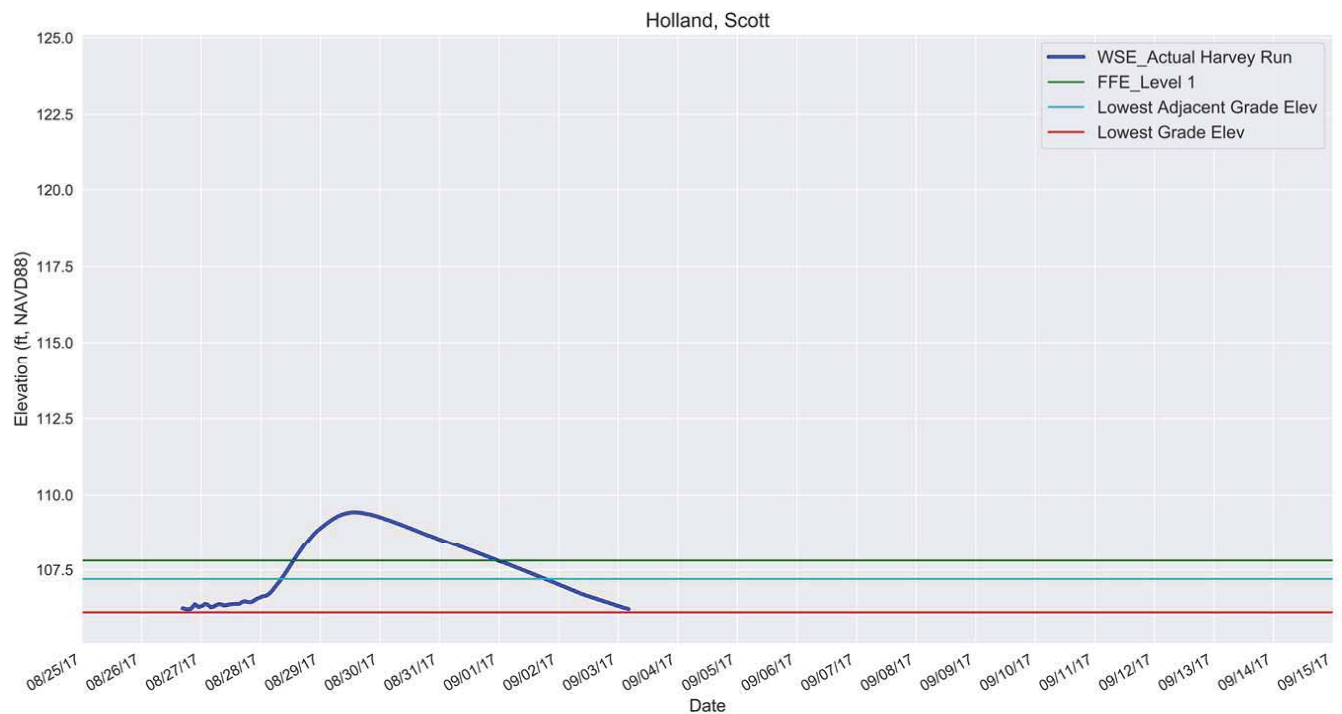


Figure C.9: Simulated water surface elevations at the property of Holland, Scott (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
109.4	109.3 / 110.2	1.6 ft	3 - 4 ft. There was 2 ft when evacuated on 8/28/2017

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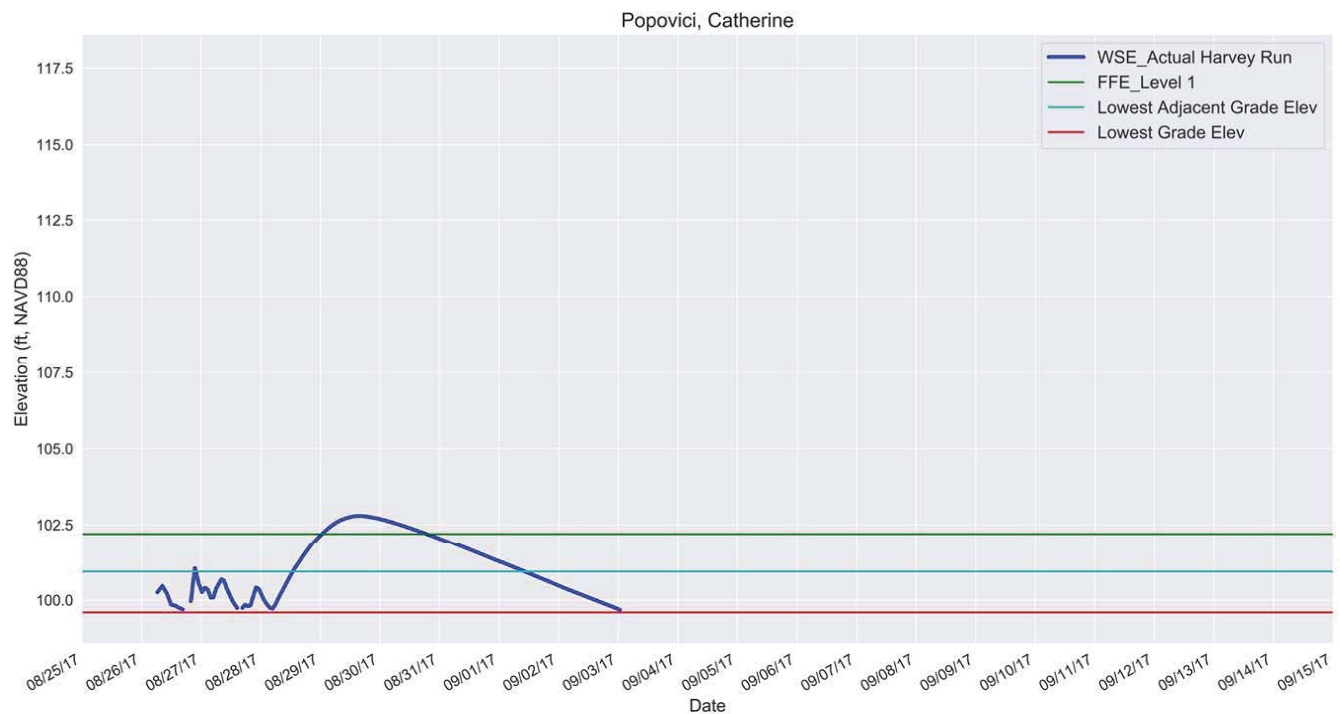


Figure C.10: Simulated water surface elevations at the property of Popovici, Catherine (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
102.8	N/A	7.2"	4" outside house. No flooding in house.

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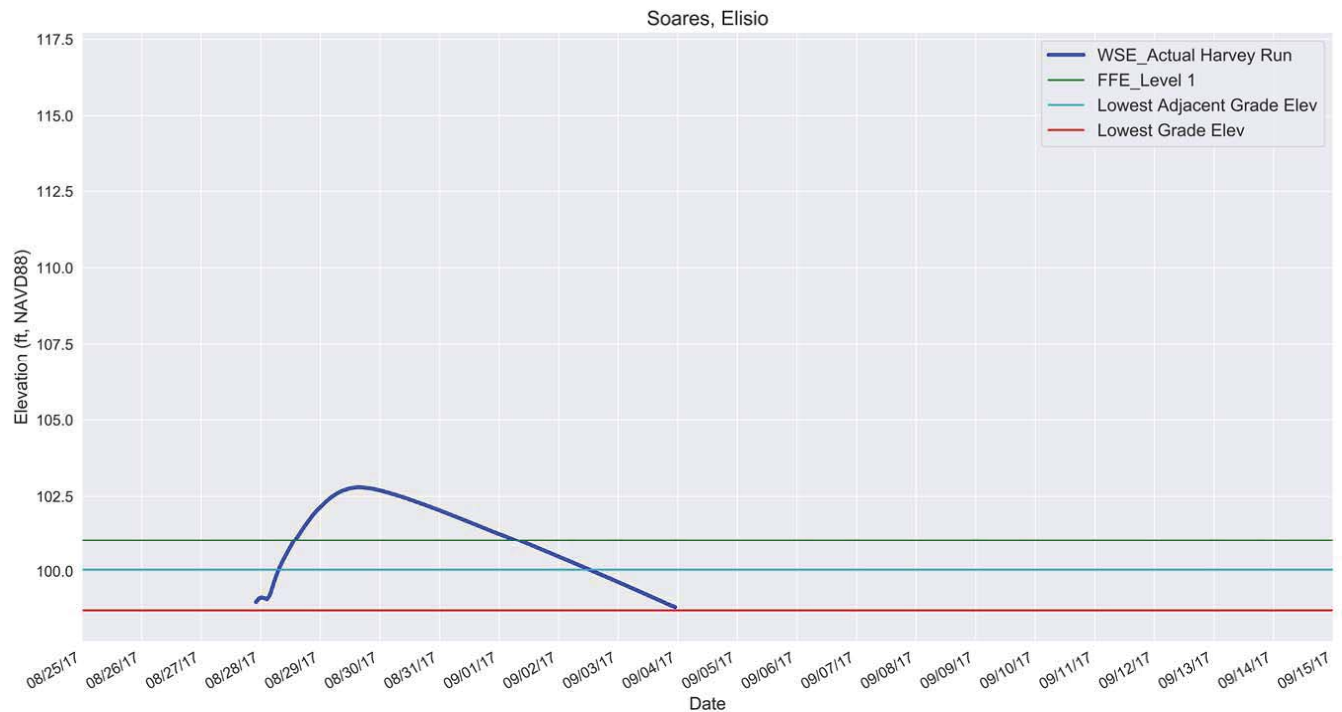


Figure C.11: Simulated water surface elevations at the property of Soares, Elisio (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
102.8	N/A	20.9"	8" - 36"

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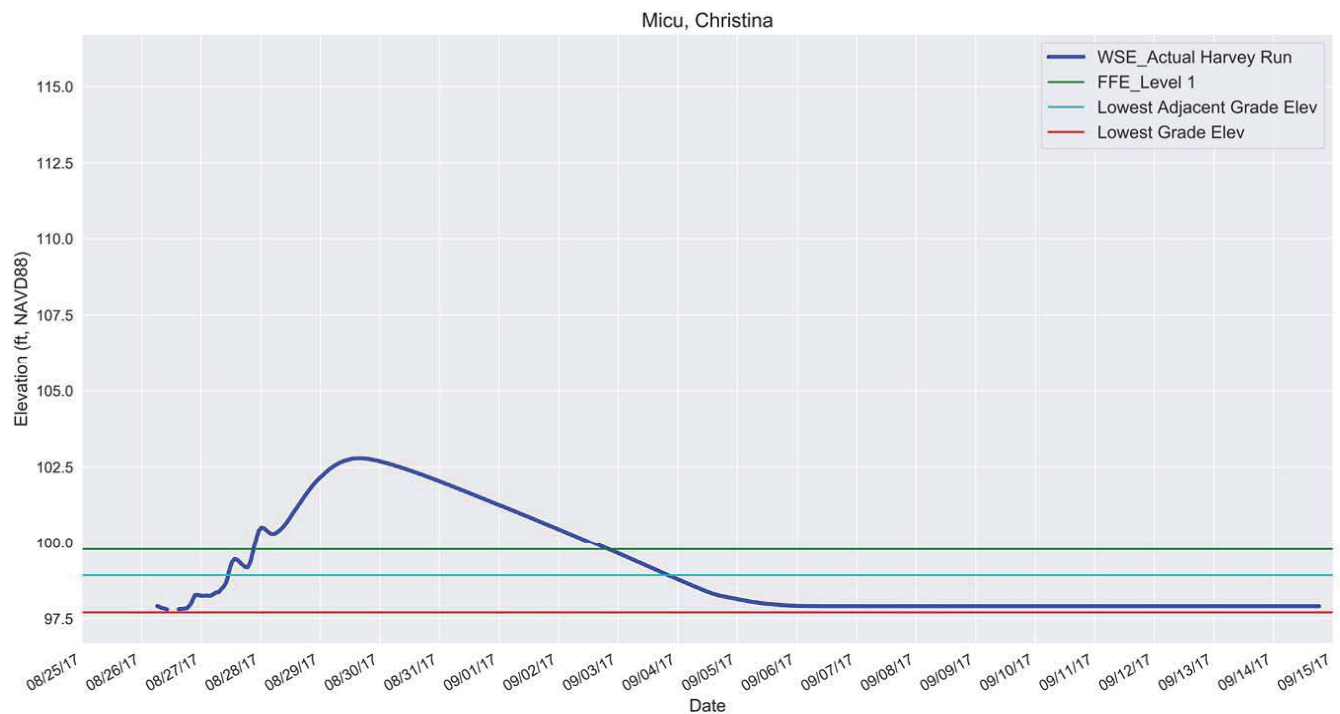


Figure C.12: Simulated water surface elevations at the property of Micu, Christina (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
102.8	101.6 / 101.1	36"	21" inside and 31" outside

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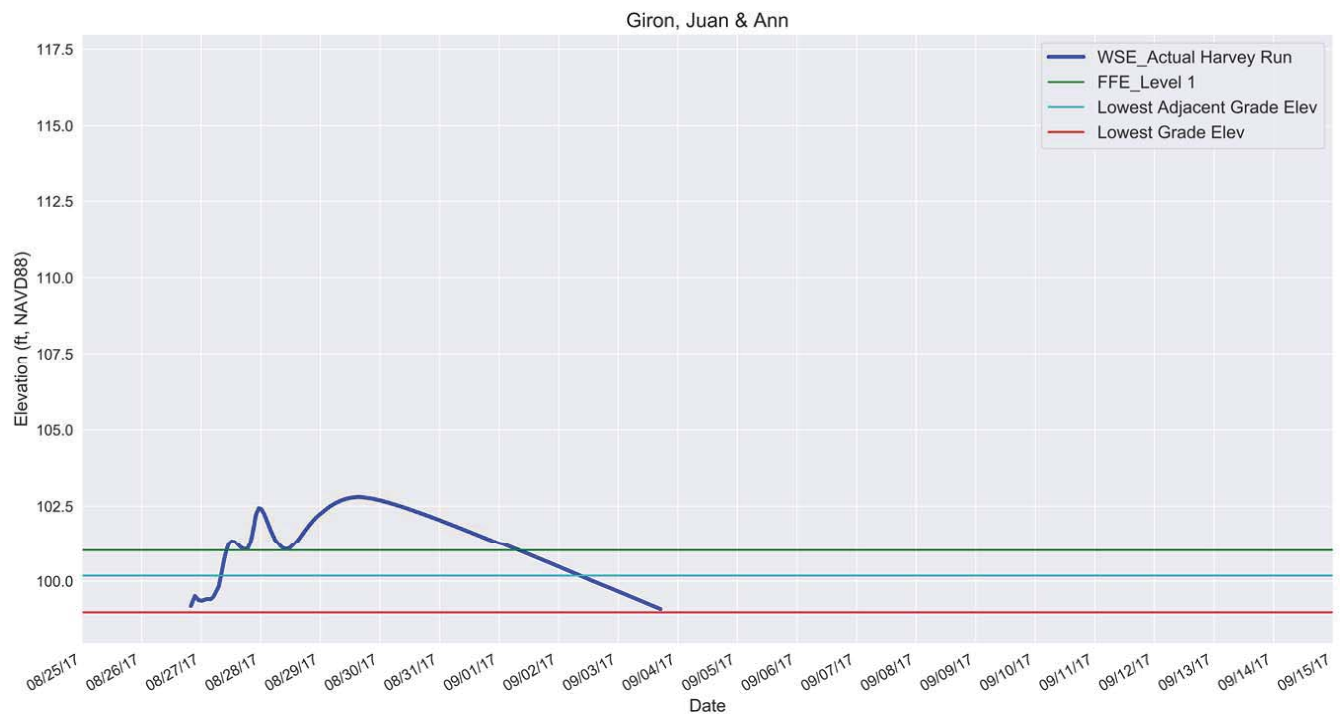


Figure C.13: Simulated water surface elevations at the property of Giron, Juan & Ann (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
102.8	N/A	21.5"	6" - 10" or more

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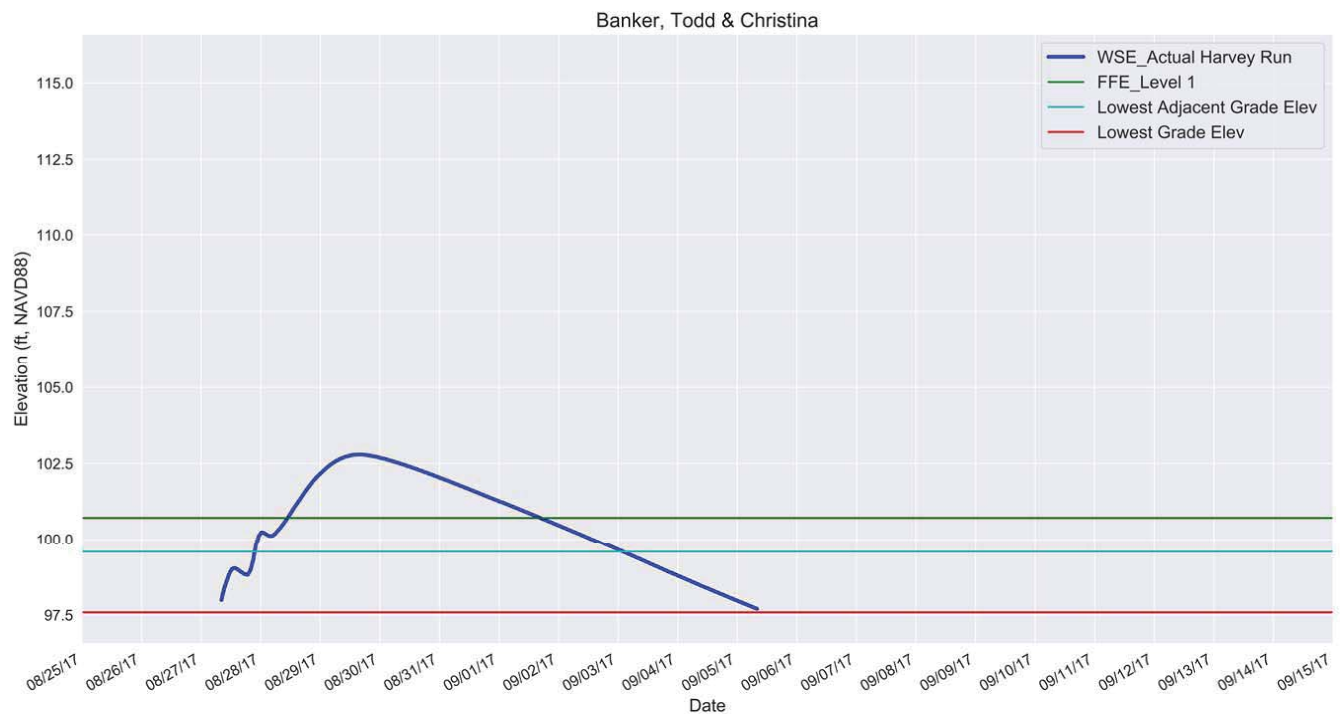


Figure C.14: Simulated water surface elevations at the property of Banker, Todd & Christina (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [55, p. BAIRD0000346]
102.8	102.1	25"	12" - 14"

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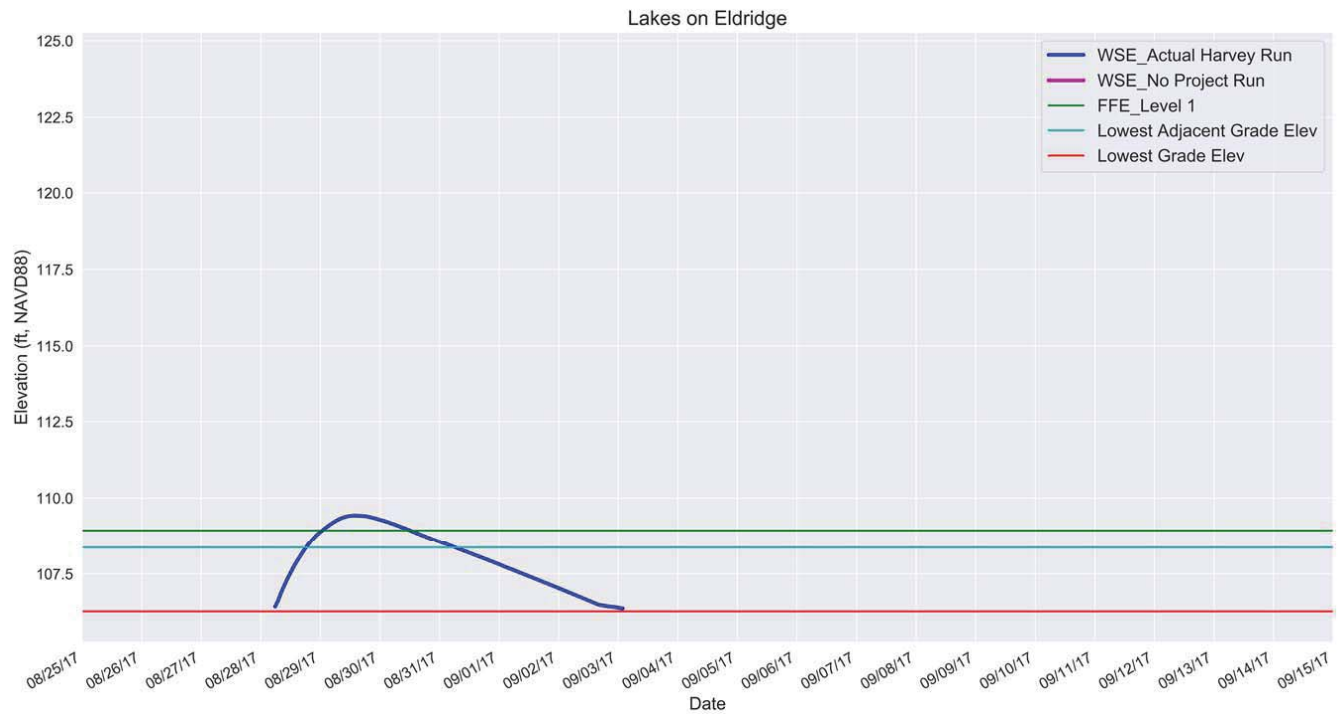


Figure C.15: Simulated free water surface elevations at Lakes on Eldridge (Actual Harvey Run and No Project Run)

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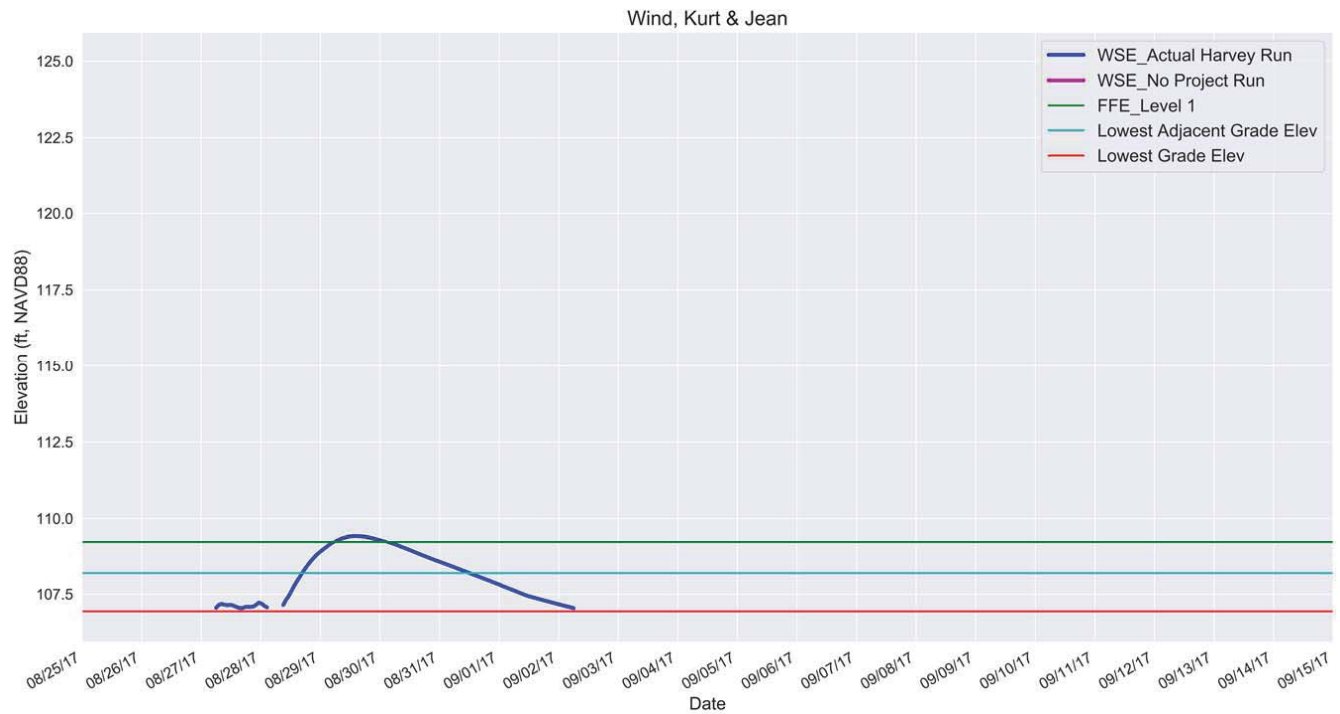


Figure C.16: Simulated free water surface elevations at the property of Wind, Kurt & Jean (Actual Harvey Run and No Project Run)

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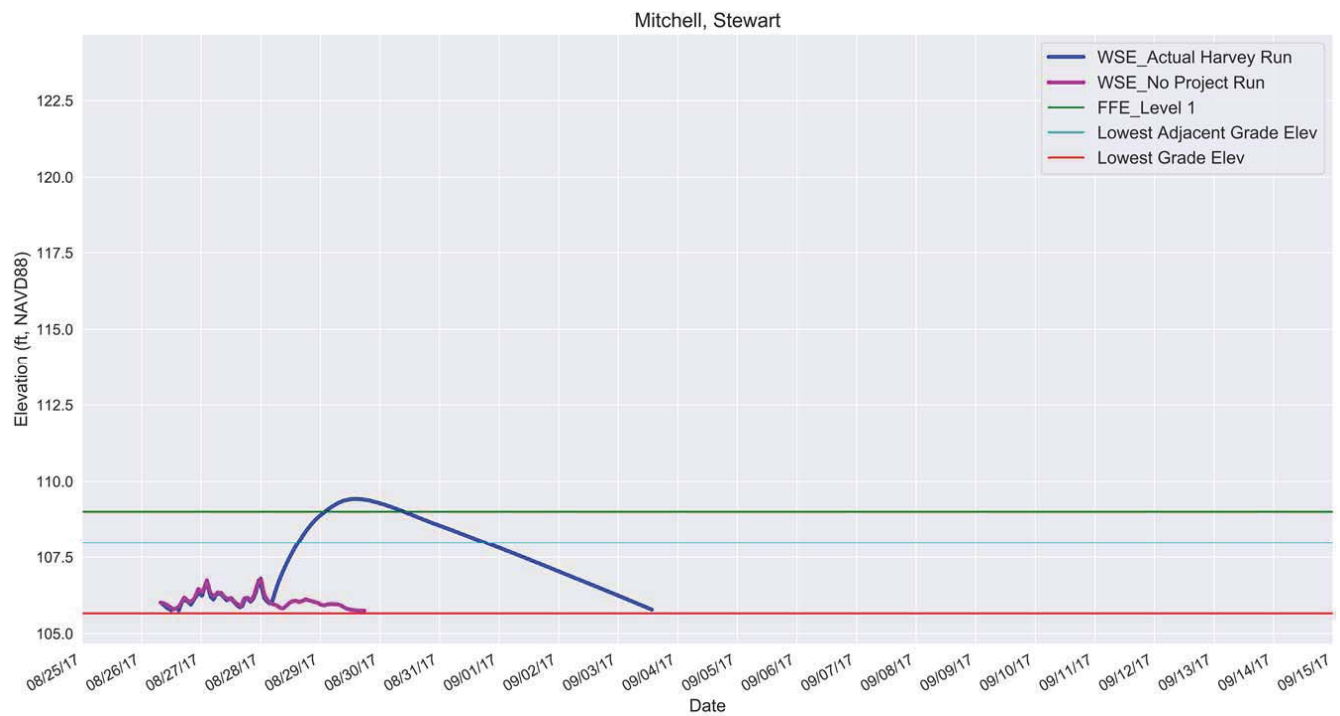


Figure C.17: Simulated free water surface elevations at the property of Mitchell, Stewart (Actual Harvey Run and No Project Run)

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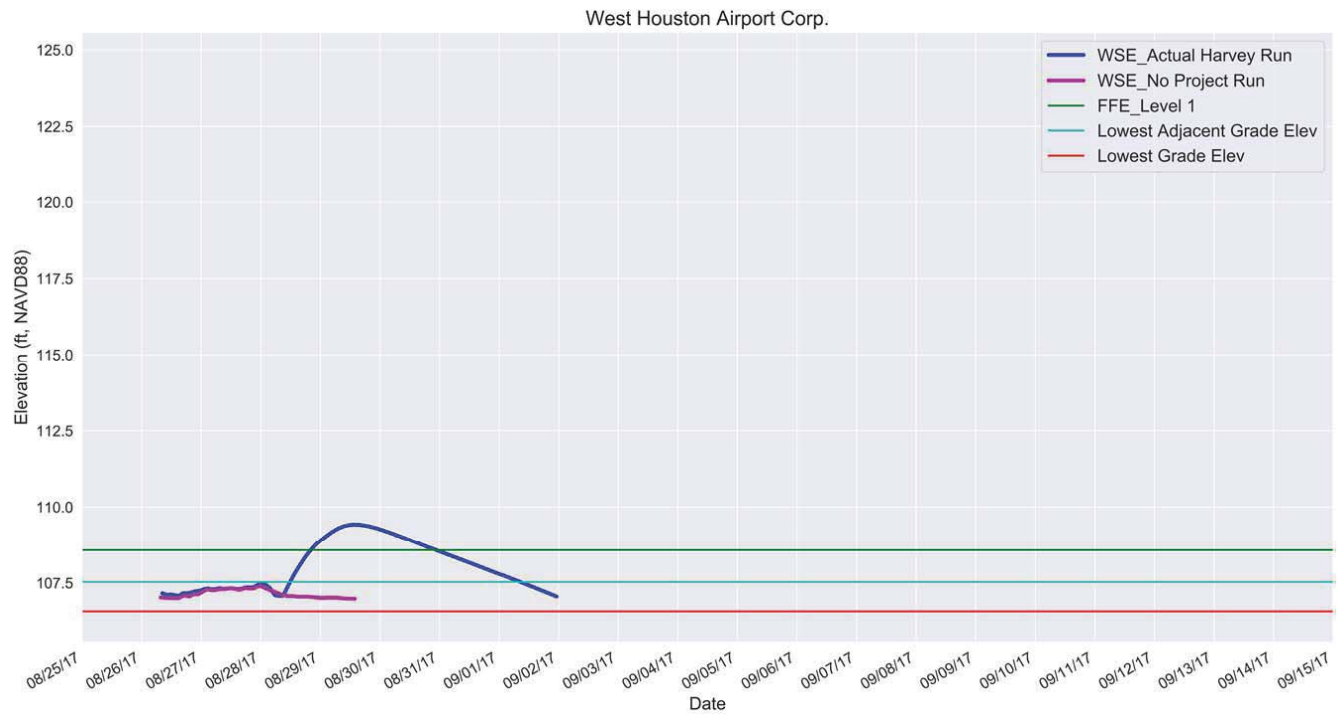


Figure C.18: Simulated free water surface elevations at West Houston Airport Corp. (Actual Harvey Run and No Project Run)

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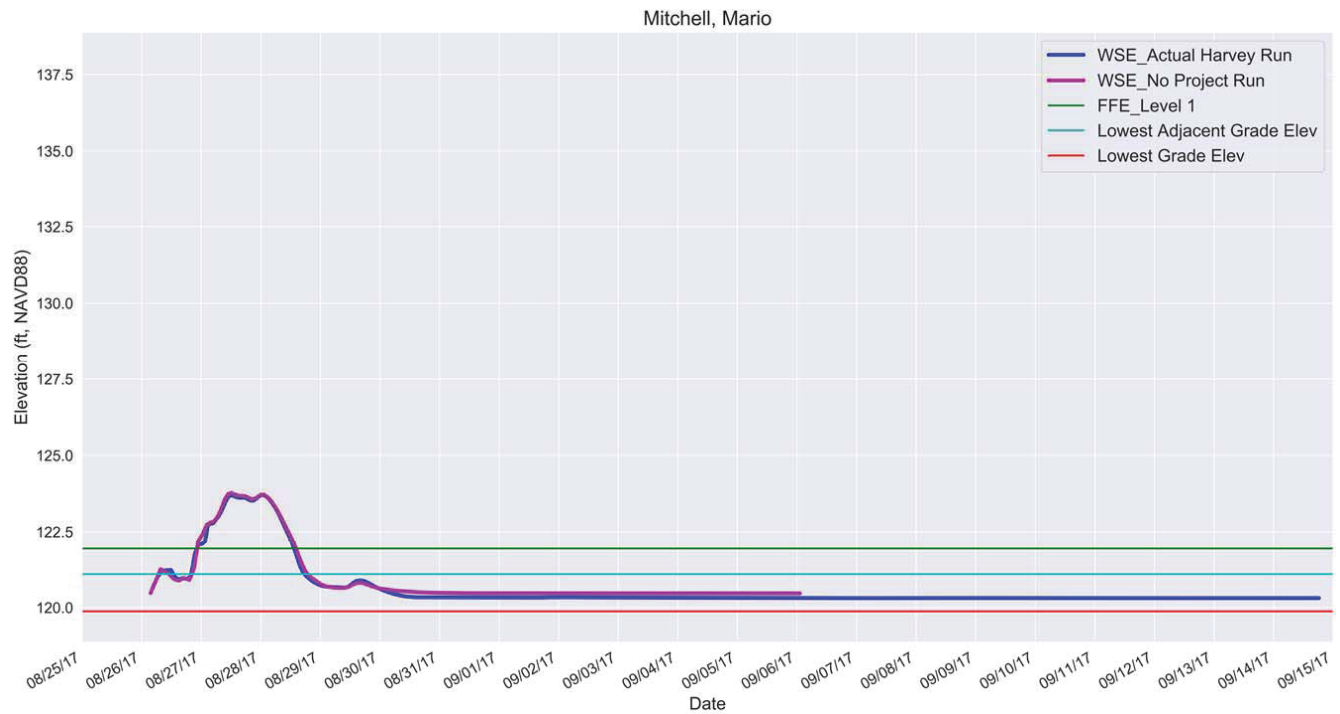


Figure C.19: Simulated free water surface elevations at the property of Mitchell, Mario (Actual Harvey Run and No Project Run)

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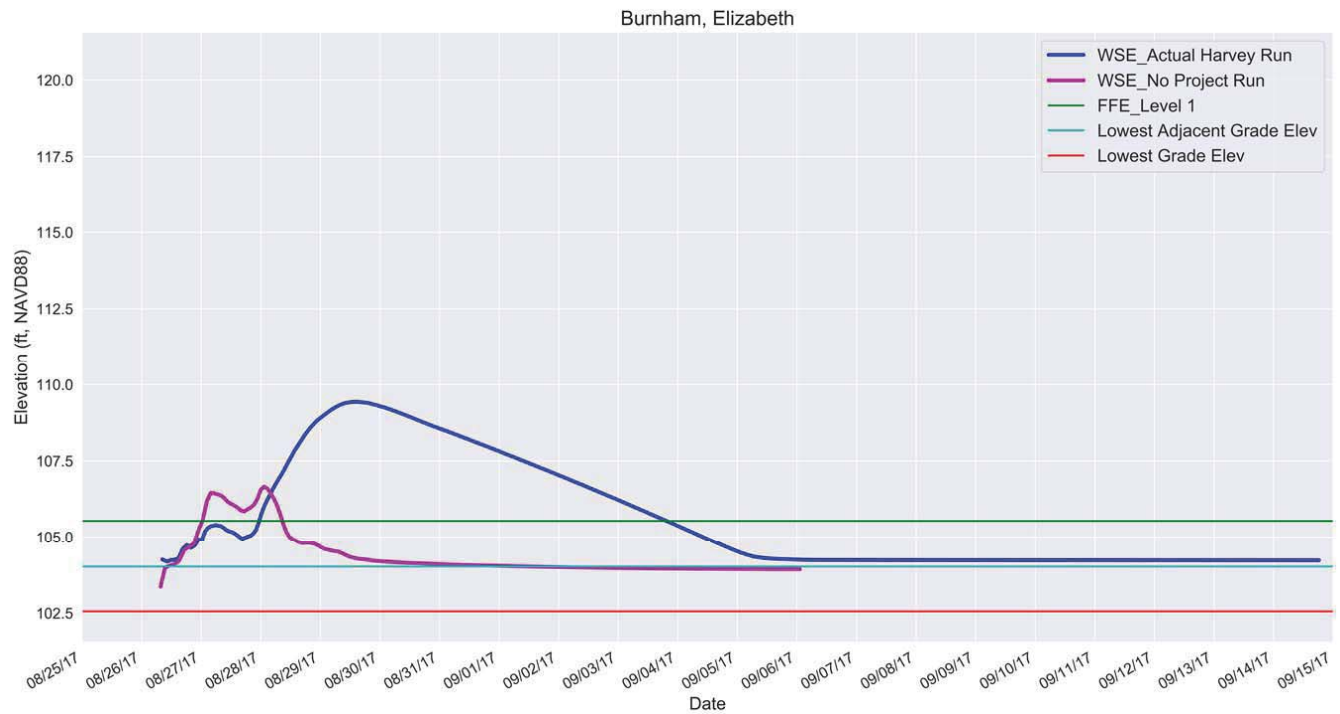


Figure C.20: Simulated free water surface elevations at the property of Burnham, Elizabeth (Actual Harvey Run and No Project Run)

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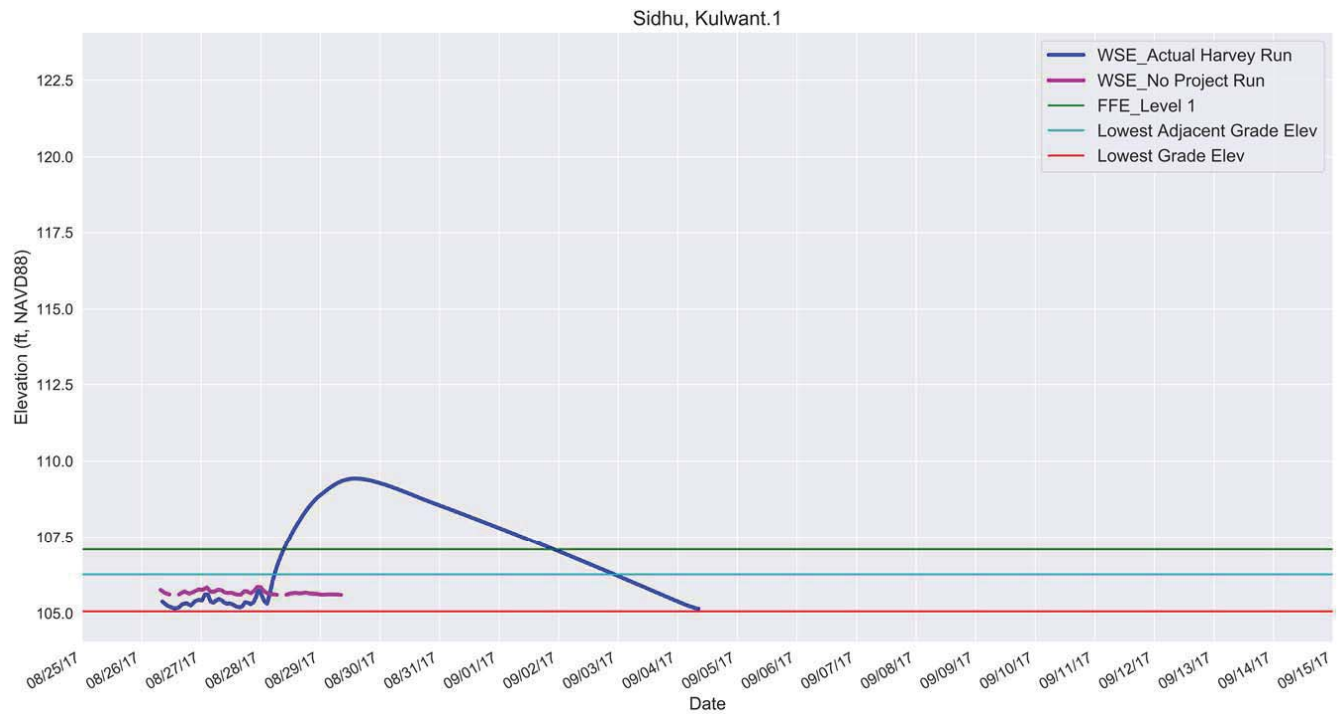


Figure C.21: Simulated free water surface elevations at the property of Sidhu, Kulwant (Actual Harvey Run and No Project Run)

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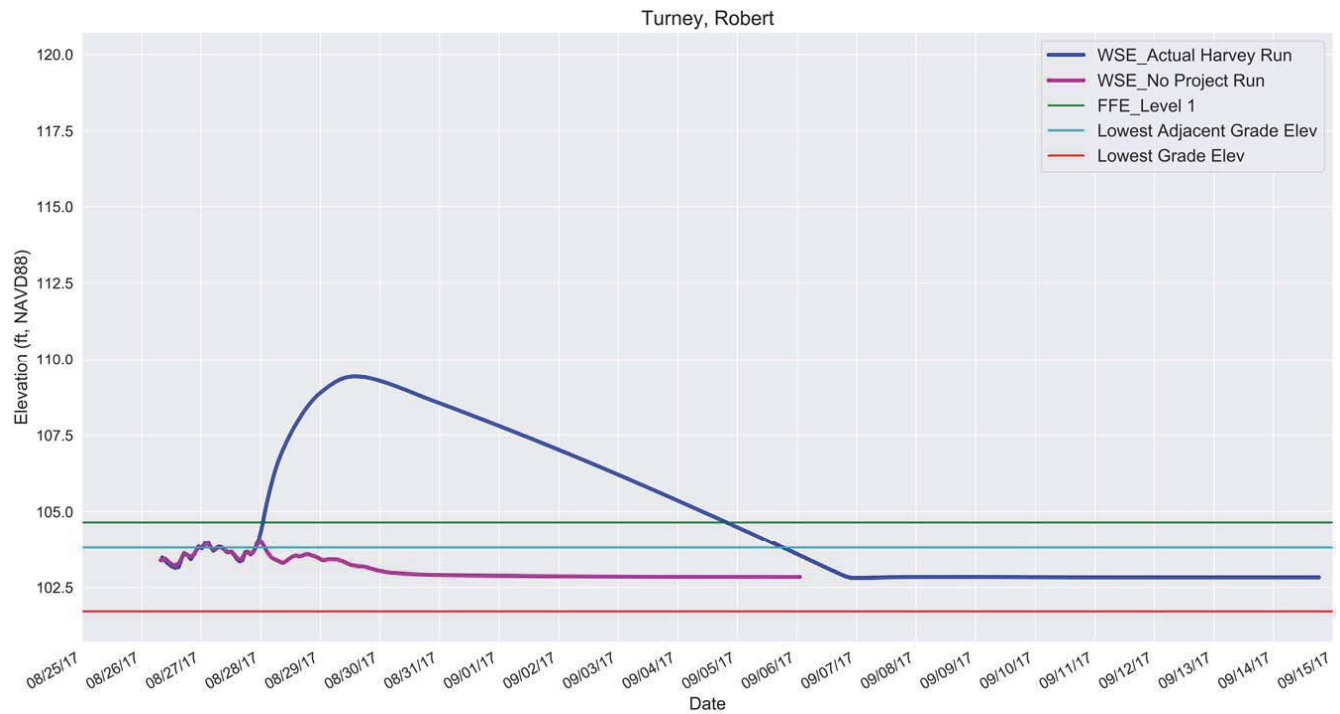


Figure C.22: Simulated free water surface elevations at the property of Turney, Robert (Actual Harvey Run and No Project Run)

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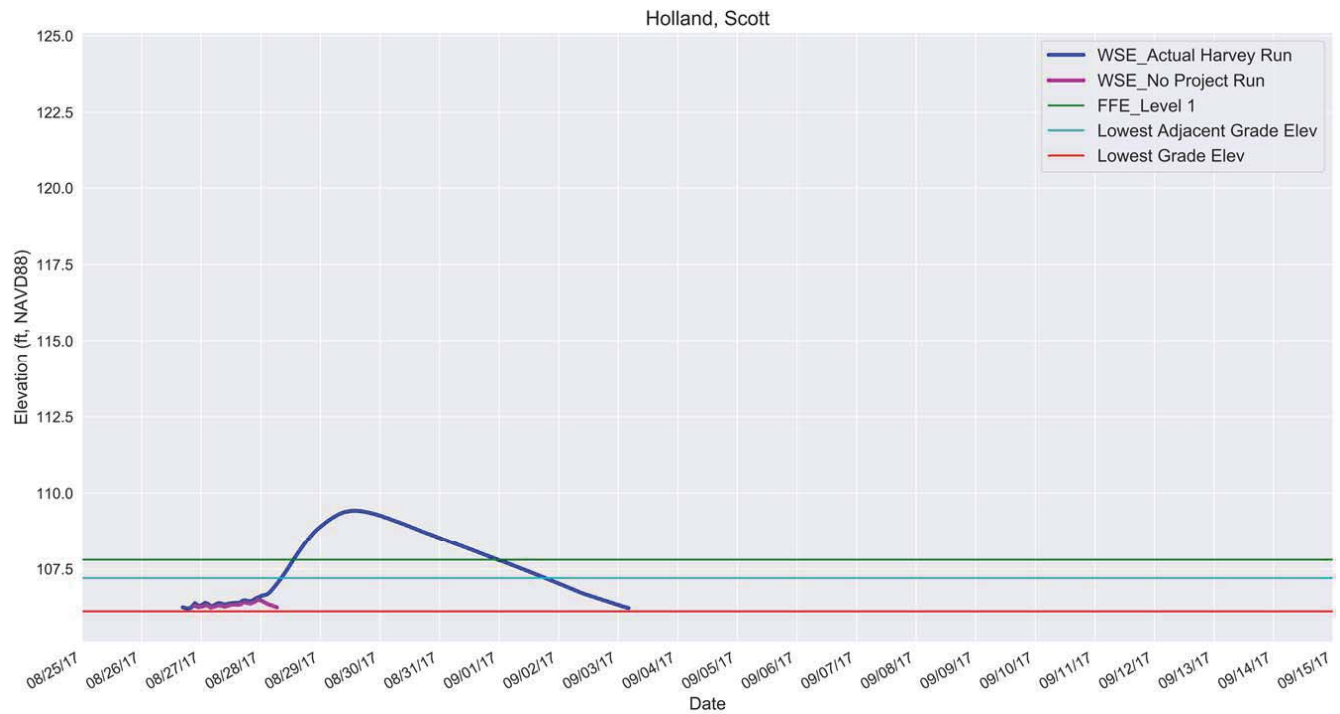


Figure C.23: Simulated free water surface elevations at the property of Holland, Scott (Actual Harvey Run and No Project Run)

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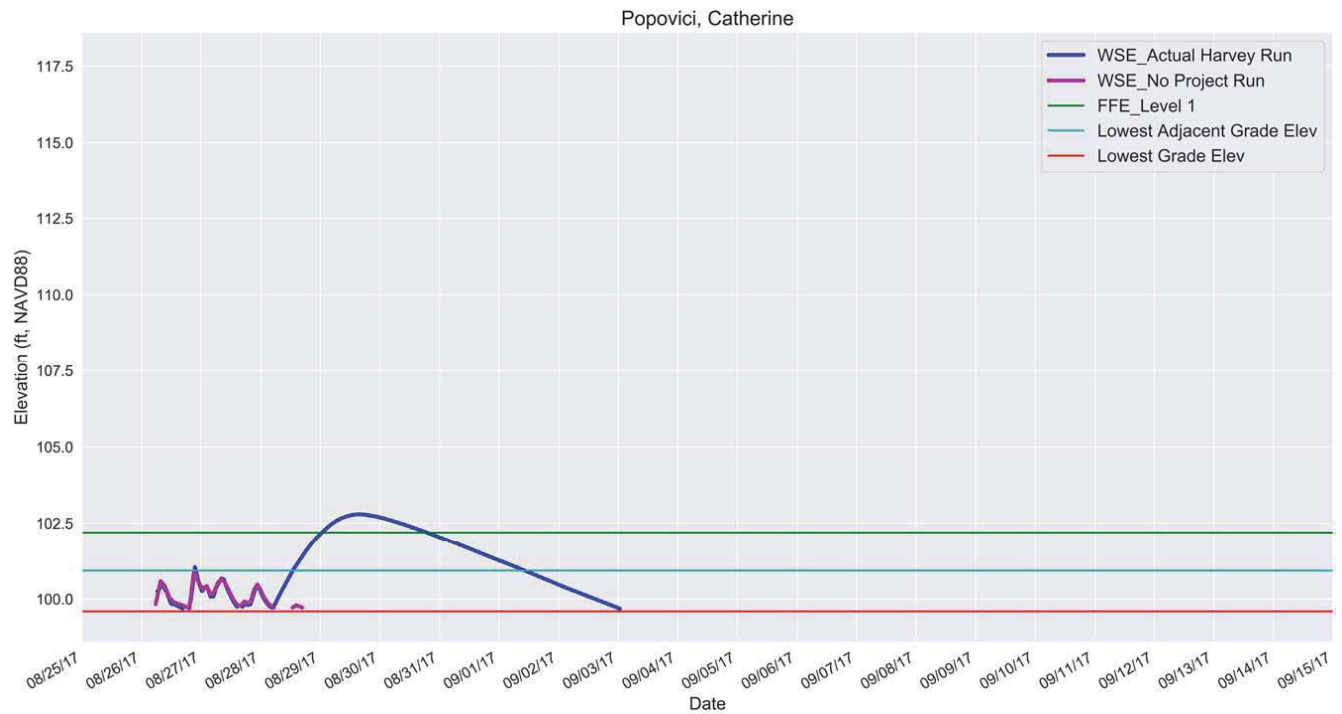


Figure C.24: Simulated free water surface elevations at the property of Popovici, Catherine (Actual Harvey Run and No Project Run)

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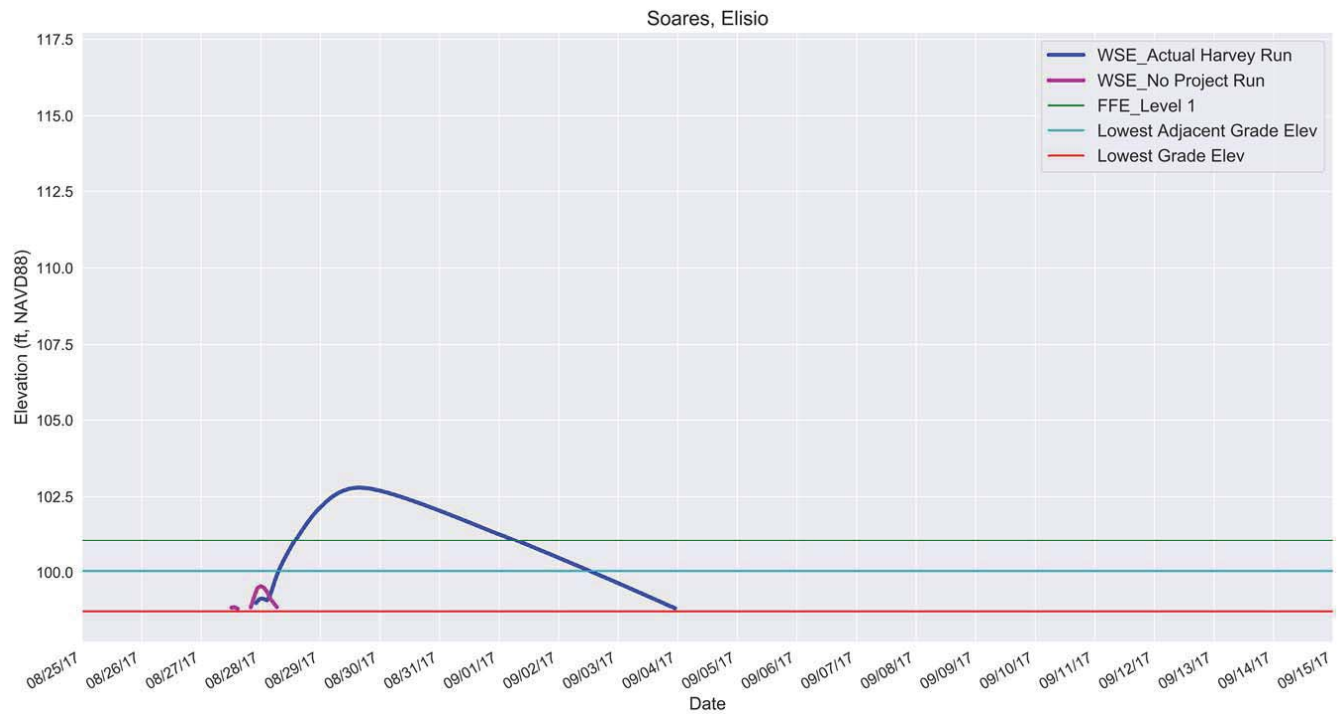


Figure C.25: Simulated free water surface elevations at the property of Soares, Elisio (Actual Harvey Run and No Project Run)

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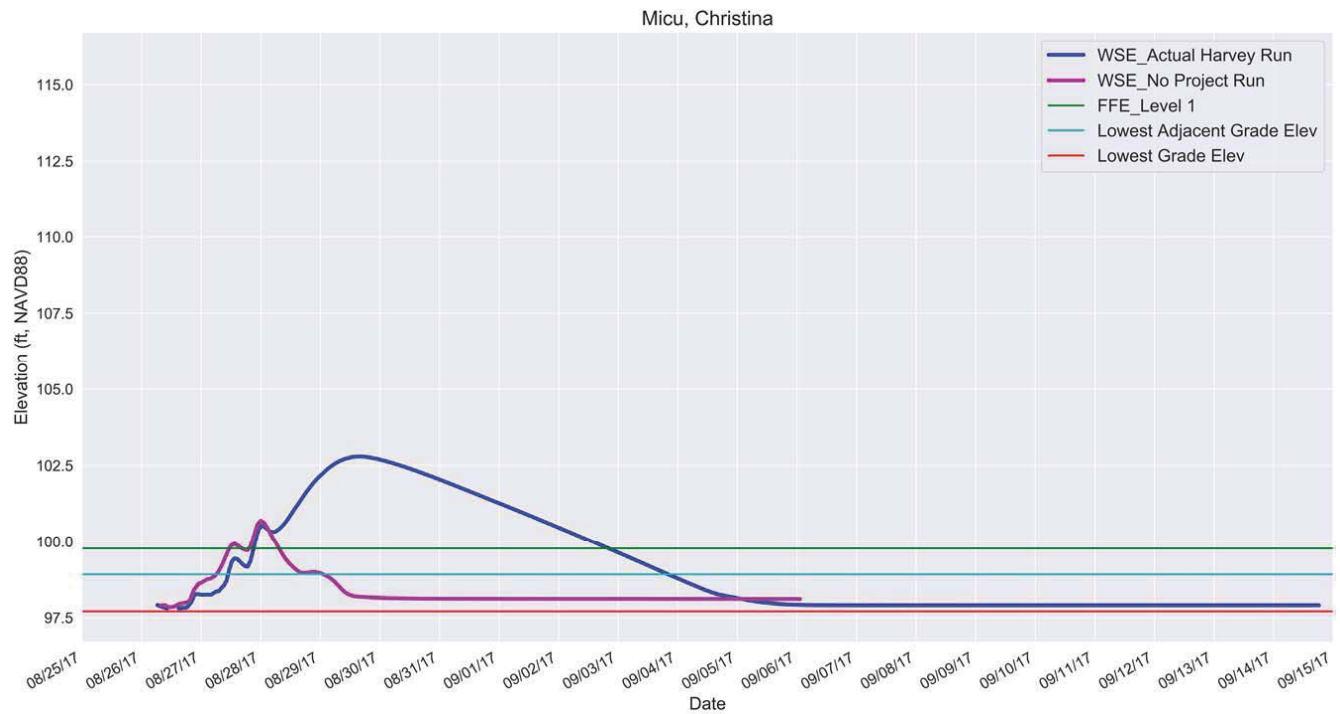


Figure C.26: Simulated free water surface elevations at the property of Micu, Christina (Actual Harvey Run and No Project Run)

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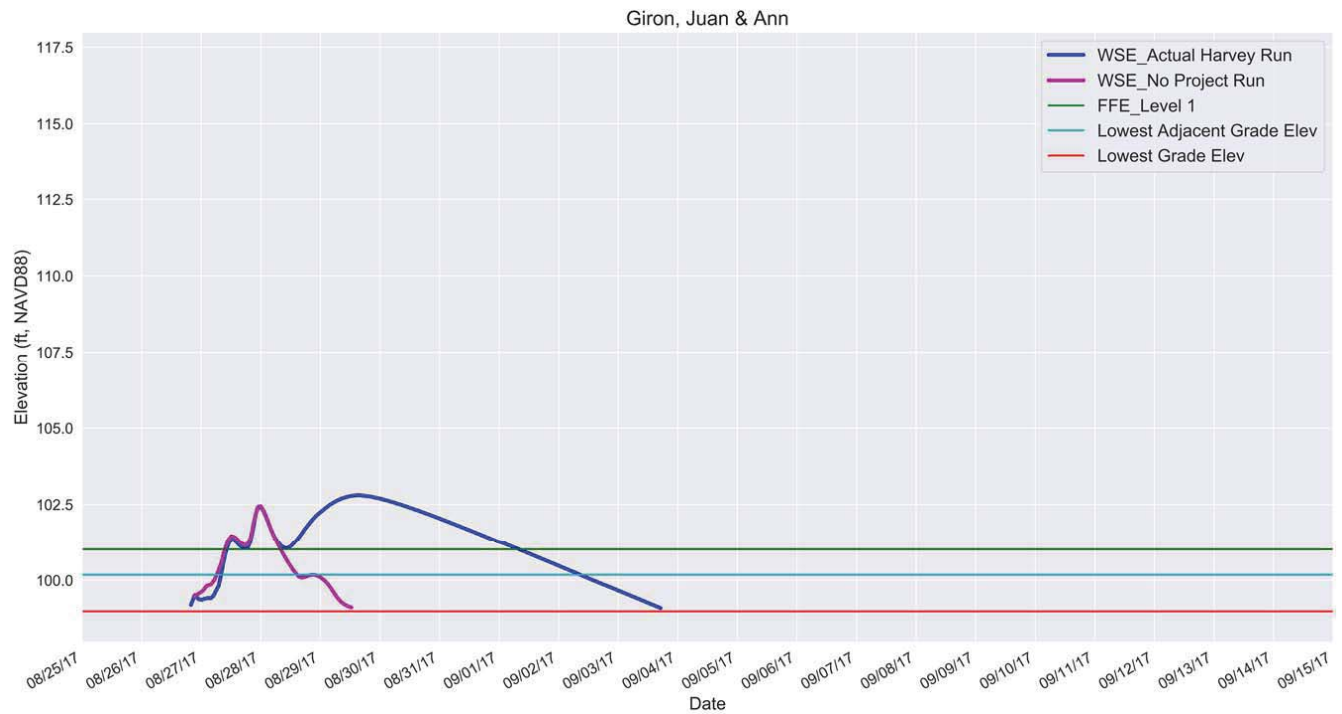


Figure C.27: Simulated free water surface elevations at the property of Giron, Juan & Ann (Actual Harvey Run and No Project Run)

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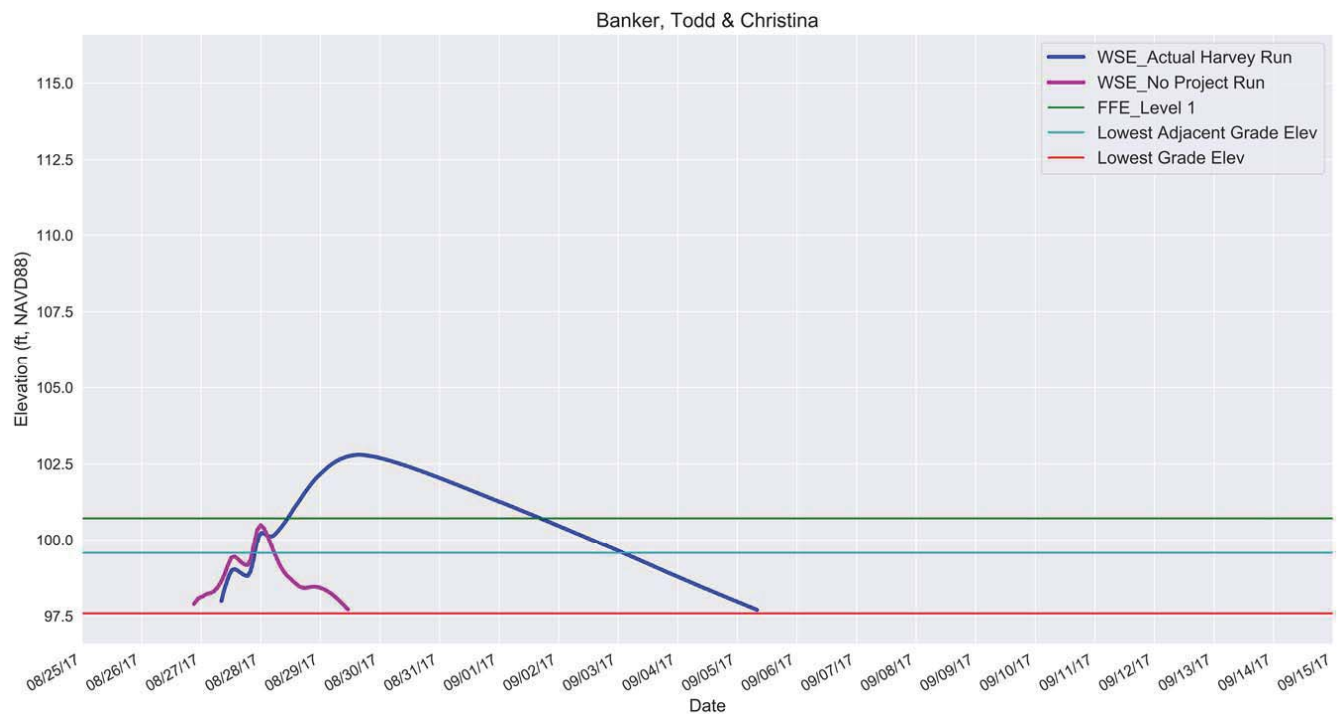


Figure C.28: Simulated free water surface elevations at the property of Banker, Todd & Christina (Actual Harvey Run and No Project Run)

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Appendix C

Addicks and Barker Flood Control Reservoirs - Upstream Hydraulic Study

Expert Report of Dr. R. Nairn (Upstream)

November 5 2018 | 12879.101.R1.Rev0

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Addicks and Barker Flood Control Reservoirs - Upstream Hydraulic Study

Expert Report of Dr. R. Nairn (Upstream)

Prepared by:

Baird.
Innovation Engineered.

W.F. Baird & Associates Ltd.

For further information, please contact

Rob Nairn at +1 608 273 0592

rnairn@baird.com

www.baird.com

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Summary of Opinions

General Opinions on Dam Operations

Hurricane Harvey exceeded Addicks and Barker Reservoirs hydraulic design conditions

The Addicks and Barker dams are designed for short term impoundment of storm water runoff. The United States Army Corps of Engineers (the Corps) designed the reservoirs based on inflow hydrographs exceeding the estimated runoff during the 1935 flood, which was the storm of record at that time.

After construction of the dams, the concept of Standard Project Floods (SPFs) entered the lexicon. The SPF is the flood that represents the most severe hydrologic conditions considered reasonably characteristic of the geographic region. The SPF has been revised for the dams over time. It was defined in the 1962 Reservoir Regulation Manual and most recently updated in the 1977 Hydrology Report. During the Hurricane Harvey event, the combined cumulative inflows to Addicks and Barker Reservoirs reached at least 450,000 acre-feet. This exceeded the 1962 SPF cumulative inflows by 63% (in addition to exceeding the 1962 SPF peak inflows by 2 to 4 times) and exceeded the 1977 revised SPF cumulative inflow to Addicks and Barker Reservoirs by 41%. The Harvey Event also exceeded the 2012 Water Control Manual SPF water surface elevations and resulted in uncontrolled spill around the north end of Addicks Reservoir for the first time in the history of the project. Due to the intensity and duration of rainfall associated with the Harvey Event, the Corps made releases in accordance with the induced surcharge release schedule for the first time in the history of the two reservoirs.

The Harvey Event exceeded the original and the revised SPF cumulative inflows to Addicks and Barker Reservoirs.

Addicks and Barker Reservoir capacities are smaller than the volume of the floodwater generated during the Harvey Event, but they effectively reduced peak flows downstream of the dams, as they were designed to do.

The combined capacity of Addicks and Barker Reservoirs is 210,500 acre-feet (68.6 billion gallons) of water within the Government Owned Land (GOL). This combined capacity is approximately 20% greater than the amount of floodwater generated under the pre-Harvey 100-year food frequency. During the Harvey Event, at least 450,000 acre-feet of floodwater flowed into Addicks and Barker Reservoirs significantly exceeding their combined capacity and dictating significant releases from the reservoirs.

The maximum combined discharge capacity of Addicks and Barker release conduits is approximately 16,000 cfs. During the Harvey Event, floodwater inflow rates to Addicks and Barker Reservoirs reached at least 160,000 cfs. Therefore, the maximum combined capacity of the release conduits was significantly exceeded. The difference in magnitude between the rapid inflow rates and the restricted outflow rates resulted in an initially rapid increase of water surface elevations behind the dams.

Despite the releases that were made during the Harvey Event, the reservoirs effectively reduced peak flows downstream of the dams, as they were designed to do.

Flooding was unavoidable during the Harvey Event

Flooding during the Harvey Event was unavoidable due to the following reasons:

- The total cumulative inflows to Addicks and Barker Reservoirs during the Harvey Event was more than twice the combined capacity of the reservoirs within the GOL.
- The maximum combined capacity of the release conduits could not discharge the excess volume of water during the Harvey Event. As such, upstream flooding was unavoidable.
- The Harvey Event exceeded the hydraulic design conditions of the Addicks and Barker Reservoirs, which required releases in accordance with the induced surcharge schedule. As such, downstream flooding was unavoidable.

Our modeling efforts showed that opening the gates entirely or, alternatively, never constructing the dams, would have resulted in much higher flooding to downstream properties, including the downstream Test Properties, than actually occurred. We utilized a similar modeling approach in the downstream sub-case using the same model inputs used for the upstream sub-case. We summarize those results for the downstream Test Properties in Appendix C. The downstream modeling results demonstrate clearly that flooding during the Harvey Event was unavoidable.

Opinions based on Simulation of Hypothetical Flood Events

Combined impact of the federal project during the Harvey Event

The federal project allows for the distribution of flood impacts across a wide area to minimize the chance of life-threatening conditions in any one area. Simulated maximum flood depths above first finished floors are between 0.2 to 4.8 ft for the upstream Test Properties, which are similar to the flood depths above finished floors at downstream Test Properties. Despite the damage due to flooding, the federal project prevented significant property damages and significantly reduced the risk of loss of life for downstream areas.

Our modeling efforts demonstrate that finished first floors on three of the thirteen upstream Test Properties would have experienced some flooding even in the absence of the federal project, which includes the Addicks and Barker Reservoirs. With the federal project in place, peak flood elevations at all of the upstream Test Properties are attributed to backwater due to high pool elevation in Addicks or Barker Reservoirs, with the exception of flooding at Mr. Mario Mitchell's property, which is no longer a Test Property since he dismissed his claim. At very high pool elevations, the rate of rise decreases significantly due to the increased reservoir capacities at such elevations. As such, backwater flooding upstream of the reservoirs is characterized by a gradual rate of rise for these elevations.

Impact of uncontrolled releases during the Harvey Event (gates fully open scenario)

Our modeling efforts demonstrate that finished first floors on six of the thirteen Test Properties would have experienced some flooding if the Corps had left the gates fully open throughout the duration of the Harvey Event.

Effectiveness of controlled releases during the Harvey Event

If the release gates of the dams had been left closed throughout the Harvey Event to minimize downstream impacts, our modeling efforts demonstrate that finished first floors on all thirteen upstream Test Properties would have experienced some flooding. Under the hypothetical scenario of no releases from Addicks and Barker Reservoirs during the Harvey Event, upstream Test Properties would have experienced 0.6 to 1.1 feet more flooding above finished first floor elevations as compared to the actual controlled release scenario. Simulated flood durations at upstream Test Properties under this hypothetical no releases scenario are much longer than under the actual controlled release scenario. During the Harvey Event, the controlled releases resulted in the reduction of flood depths, and particularly flood durations, at the upstream Test Properties.

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1. Introduction

Plaintiffs, who are property owners in the western Houston area, filed claims against the United States of America (Defendant), alleging takings of their properties associated with flooding during the extreme weather event commonly referred to as Hurricane Harvey (August 25th to August 31st, 2017, hereinafter referred to as the “Harvey Event”). Plaintiffs’ claims are hereinafter referred to as “the Case”.

Dr. Nairn of Baird & Associates was retained by the US Department of Justice (DOJ) to provide expert testimony in relation to the Case. This report presents analysis and findings related to the Case. Dr. Nairn’s CV, his previous testimony and his remuneration are presented in Appendix B.

1.1 Definitions

- “The Case” refers to *In re Upstream Addicks and Barker, (Texas) Flood Control Reservoirs*, 1:17-cv-09001, and *In re Downstream Addicks and Barker (Texas) Flood Control Reservoirs*, 1:17-cv-09002.
- “Corps” refers to the United States Army Corps of Engineers.
- The “Harvey Event” refers to Hurricane Harvey landfall event from August 25th to August 31st, 2017.
- “Focus Area” refers to the area considered by this study for detailed analysis, as defined in Section 2.1, including all Test Plaintiffs.
- “Focus Period” refers to the period of reported inundation within the Focus Area between August 26 and September 12, 2017, as defined in Section 2.1.
- “Plaintiffs” or “Plaintiff” refers to any of the individuals or entities who filed claims related to the Case within the Focus Area.
- “Defendant” means the United States of America.
- “Upstream Areas” means the areas upstream of the Addicks and Barker Reservoirs within the Focus Area.
- “Downstream Areas” means the areas downstream of the Addicks and Barker dams within the Focus Area.
- “Test Plaintiffs” or “Test Properties” refer to Plaintiffs and their properties, selected by the parties for expert consideration.
- “GOL” refers to Government Owned Land.
- “USGS” refers to the United States Geological Survey.
- “HCFCD” refers to the Harris County Flood Control District.
- “Lower Langham Creek” refers to the outlet channel of Addicks Reservoir extending from the Addicks outlet to the confluence with lower Buffalo Bayou (approximately 1.3 miles in length).
- “Waterbody” refers to a general word that encompasses all types of free surface water bodies such as channels, bayous, lakes, reservoirs, oceans, etc.
- “Tailwater” refers to water downstream of any given waterbody.
- “Steady Flow” refers to a flow regime where discharge and flow depth do not change with time.
- “Flow Regime” refers to the type of flow through channels and streams, which could be “Uniform Flow”, “Non-uniform Flow”, “Steady Flow”, and/or “Backwater Flow”.
- “Uniform Flow” refers to a flow regime where the slopes of the channel bed, water surface and energy grade line are equal.
- “Non-uniform flow” refers to a flow regime which is not uniform.

- “Backwater flow” refers to a non-uniform flow regime where water surface slope becomes flatter than the slope of the channel bed due to channel constrictions, dams, and/or high tailwater surface elevation.
- “WSE” refers to Water Surface Elevation.
- “Runoff” or “surface runoff” refers to gravity-driven flow of water over the ground surface due to excess rainfall, stormwater or any other source.
- “Excessive runoff” refers to runoff discharges beyond the capacity of the receiving stormwater drainage system.
- “SPF” refers to Standard Project Flood, which is defined “as a hydrograph representing runoff from the Standard Project Storm” (SPS). The SPS “should represents the most severe flood-producing rainfall depth-area-duration relationship and isohyetal pattern of any storm that is considered reasonably characteristic of the region in which the drainage basin is located” [1, p. USACE000497]. The SPF defines the hydraulic design criteria of a reservoir.
- “SDF” refers to Spillway Design Flood, which is the maximum flood that could cause flow over a spillway without causing serious structural damage.

1.2 Study Objectives

This study focuses on the hydraulic aspects of the Addicks and Barker dams without consideration of structural or geotechnical aspects (i.e., structural dam safety aspects). The following are the main objectives of this hydraulic study:

- Define hydraulic factors that resulted in inundation during the Harvey Event within the Focus Area. To address this objective, the following analyses have been completed:
 - Analysis of physical data during the Harvey Event; and
 - Numerical modelling of inundation during the Harvey Event to fill the physical data gaps (between and beyond the gages where water levels were measured) and to simulate hypothetical scenarios to define and/or isolate hydraulic factors contributing to inundation within the Focus Area.
- Provide a tool to evaluate flooding under various hypothetical scenarios. To address this objective, numerical model simulations have been completed for one hypothetical scenario where the Addicks and Barker Reservoirs were removed and two hypothetical gate operation scenarios where the gates are simulated as fully open for the duration of the Harvey Event, and fully closed for the duration of the Harvey Event.

2. Site Conditions

This section provides a description of the site conditions upstream and downstream of the Addicks and Barker dams.

2.1 Focus Area and Focus Period

Hurricane Harvey made landfall in the Southeast Texas area dropping 30 to 40 inches of rainfall on Harris County¹ between August 25th and August 31st, 2017, which caused overbank flooding and inundation of land. Damages, allegedly due to inundation of homes, have been reported during the period from August 26, 2017 [2] to September 12, 2017 [3], [4] (hereinafter referred to as the "Focus Period").

This study focuses on inundation of the following areas, herineafter referred to as the "Focus Area":

- Areas upstream of Addicks and Barker Reservoirs within a 2-mile buffer from the GOL and bounded by Westpark Tollway (South) and W Little York Rd (North).
- Areas along Buffalo Bayou downstream of Addicks and Barker dams down to Shepherd Drive bounded by Westheimer Rd (South) and Interstate 10 (North).

The Focus Area is shown in Figure 2-1 along with locations of upstream Test Plaintiffs.

¹ Approximate range based on Harris County Flood Control District's gage data [14]. The National Weather Service (NWS) "estimated anywhere from 20 to 30 TRILLION TONS of water was dumped onto Texas" [52].

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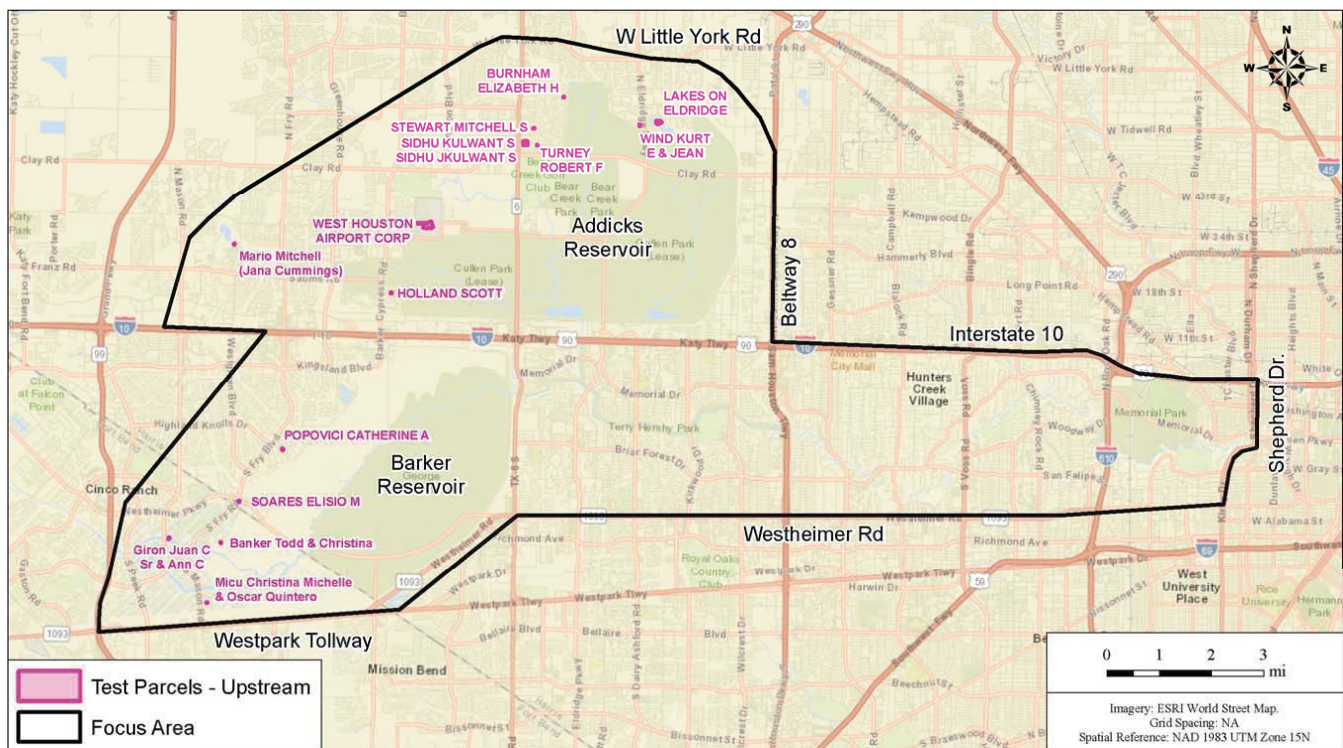


Figure 2-1: Focus Area, purple polygons represent locations of upstream Test Plaintiffs.

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2.2 Watershed

Harris County has classified 22 major watersheds draining into 22 major waterways [5]. Figure 2-2 shows watershed boundaries, which are largely determined by the topography. Each of these watersheds ultimately drains into Galveston Bay [6, p. FEMA000165].

Many of the drainage basins within Harris County² are characterized by basin overflow [6, p. FEMA000249], which occurs when the water surface elevations exceed the elevations of the drainage basin divide. "Under major flood events, Addicks Reservoir receives about one-third of its total volume from the 130 square mile drainage area of the Upper Cypress Creek Basin" [7, p. USACE020199].

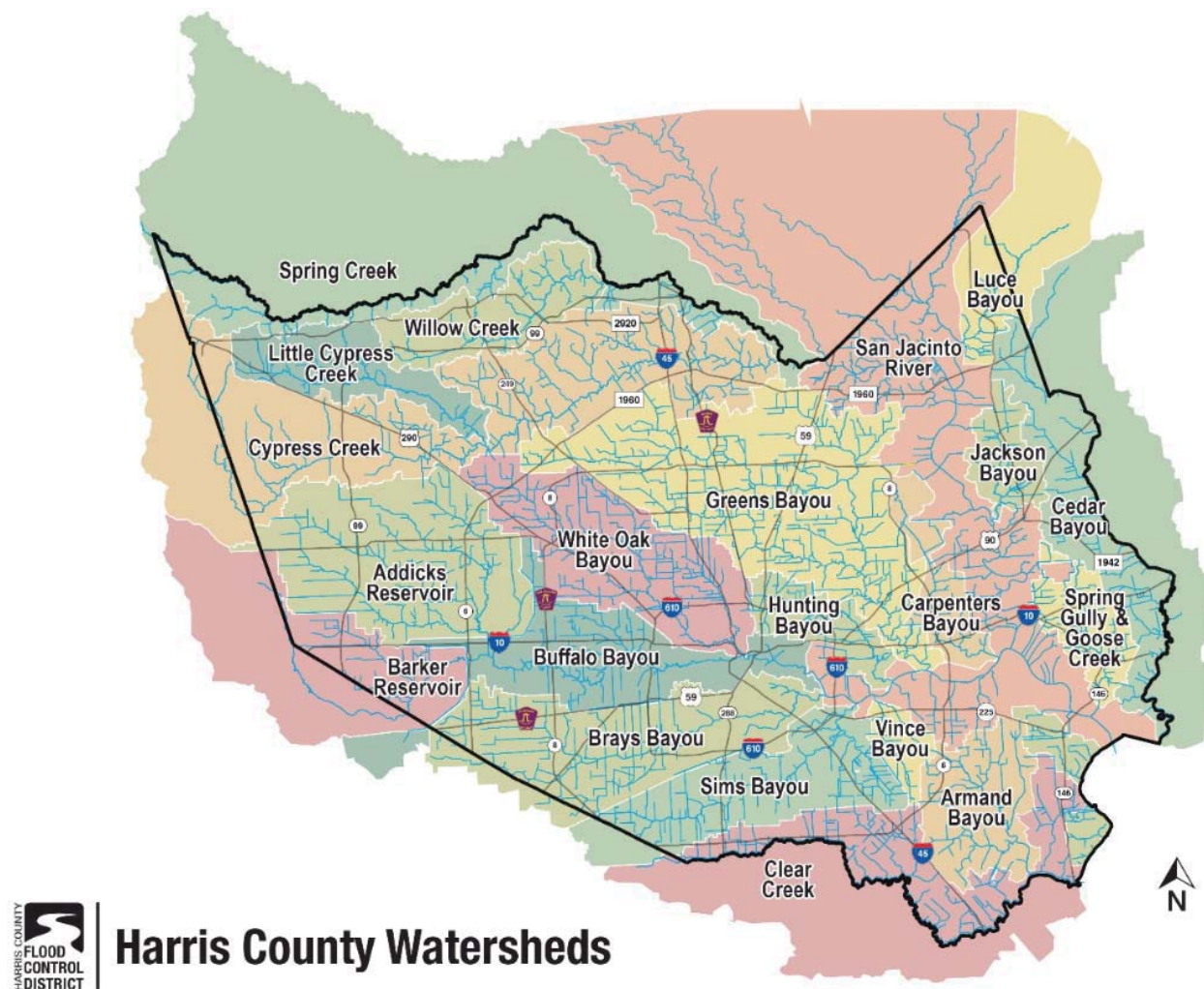


Figure 2-2: Harris County Watersheds [5].

² Part of the Barker Reservoir watershed is located in Fort Bend County.

2.3 Topography

The 2008 Light Detection and Radar (LiDAR) survey covering Harris County and surrounding areas (the entire watershed described above) was downloaded from “Houston Galveston Area Council” [8]. This survey also covers areas in Fort Bend on the southwestern side of Barker reservoir and was completed to support numerous GIS applications including flood modelling and prevention [9, pp. BAIRD0000294-345]. In addition, the 2014 LiDAR survey covering Fort Bend was downloaded from “StratMap 2014, Fort Bend Lidar” [10]. The 2008 and 2014 Lidar surveys were compared in overlapping areas within Fort Bend and found to be consistently similar.

2.4 Channel Bathymetry

An accurate representation of the topography and drainage network is essential for the accurate estimation of storage and routing of flows in the hydrodynamic model. LiDAR data define ground elevations above the water surface elevation in ponds and streams at the time the LiDAR was flown³. As such, channel bed elevations may not be represented by the LiDAR data.

The channel cross-section data provided by the Harris County Flood Control District (HCFCD) demonstrates this issue [11]. Figure 2-3 shows the LiDAR data shaded by elevation and the location of the HCFCD cross-sections as dashed lines. The water surface elevation at the time of the LiDAR survey was approximately 0 ft, NAVD88. The inset to the top right shows a profile view of the surveyed cross-section (highlighted in red in the main figure). The wetted portion of the channel from the HCFCD cross-sections, shaded in blue in the inset, was not captured during the LiDAR survey and was merged into the LiDAR-based Digital Elevation Model (DEM).

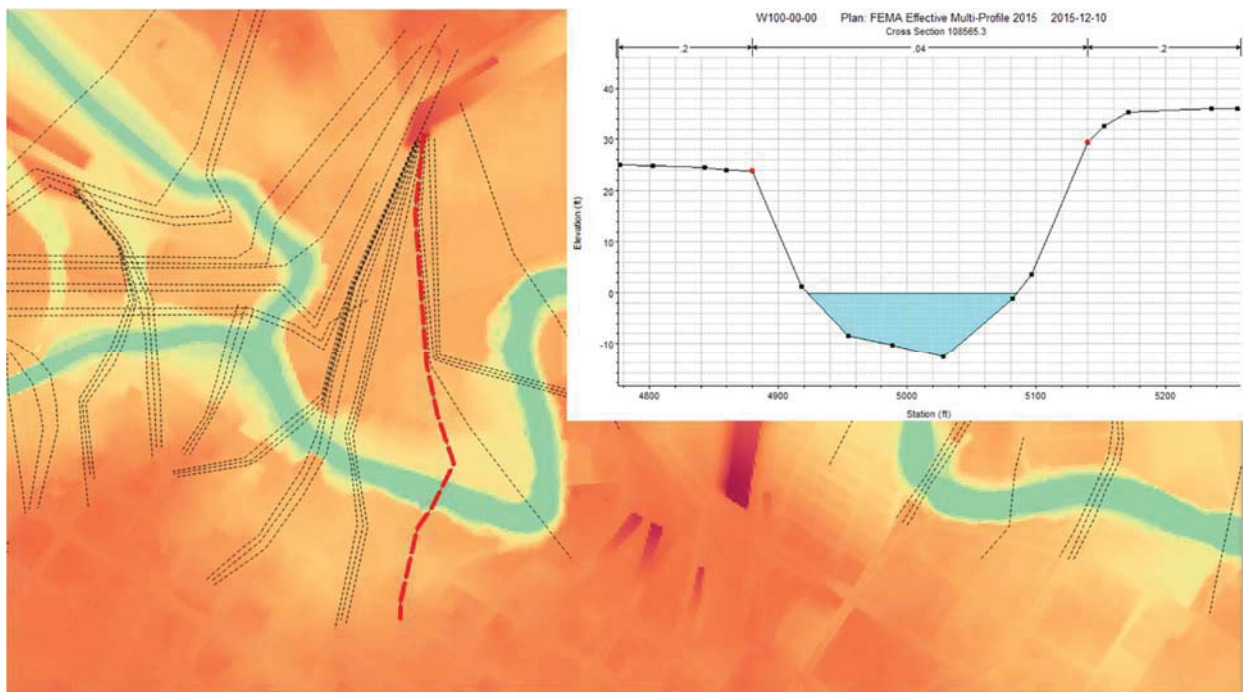


Figure 2-3: Example of 2008 LiDAR and HCFCD HEC-RAS data set.

³ Conventional LiDAR does not penetrate below the water surface.

2.4.1 HCFCD HEC-RAS Models and Cross Section Data

We addressed this channel bathymetry issue in two ways. First, we used the 237 HEC-RAS models developed by HCFCD for the Harris County region [11]. The one-dimensional HEC-RAS models consist of a series of cross-sections and related information (bridge and culvert details, channel and floodplain roughness, ineffective flow areas, etc.). The cross-sections were developed from a combination of field surveys (within the channel banks) and LiDAR data (floodplains).

A total of 146 HEC-RAS models were downloaded from HCFCD Model and Map Management (M3) System [11]. The downloaded models have a combined length of over 800 miles and include the main stem and tributaries of: Addicks Reservoir, Barker Reservoir, Brays Bayou, Buffalo Bayou, Carpenter Bayou, Cypress Creek, Greens Bayou, Hunting Bayou, Little Cypress Creek, San Jacinto River, Sims Bayou, Spring Creek, Vince Bayou, and White Oak Bayou. Models outside the Focus Area were not processed. Figure 2-4 and Figure 2-5 outline the streams that were acquired from [11] for upstream and downstream areas, respectively.

The HEC-RAS cross-sections upstream of Addicks and Barker Reservoirs are shown in red in Figure 2-6 and Figure 2-7, respectively. As shown in Figure 2-7, Upper Buffalo Bayou (located mostly in Fort Bend) was not covered by the HEC-RAS cross sections. It is also noted that HEC-RAS cross-sections do not cover streams inside Addicks and Barker Reservoirs.

The HEC-RAS cross-sections for a portion of Buffalo Bayou, Turkey Creek, Rummel Creek, and other tributaries are shown in red in Figure 2-8. Lower Langham Creek (Addicks outlet) is not represented by the HEC-RAS cross-sections.

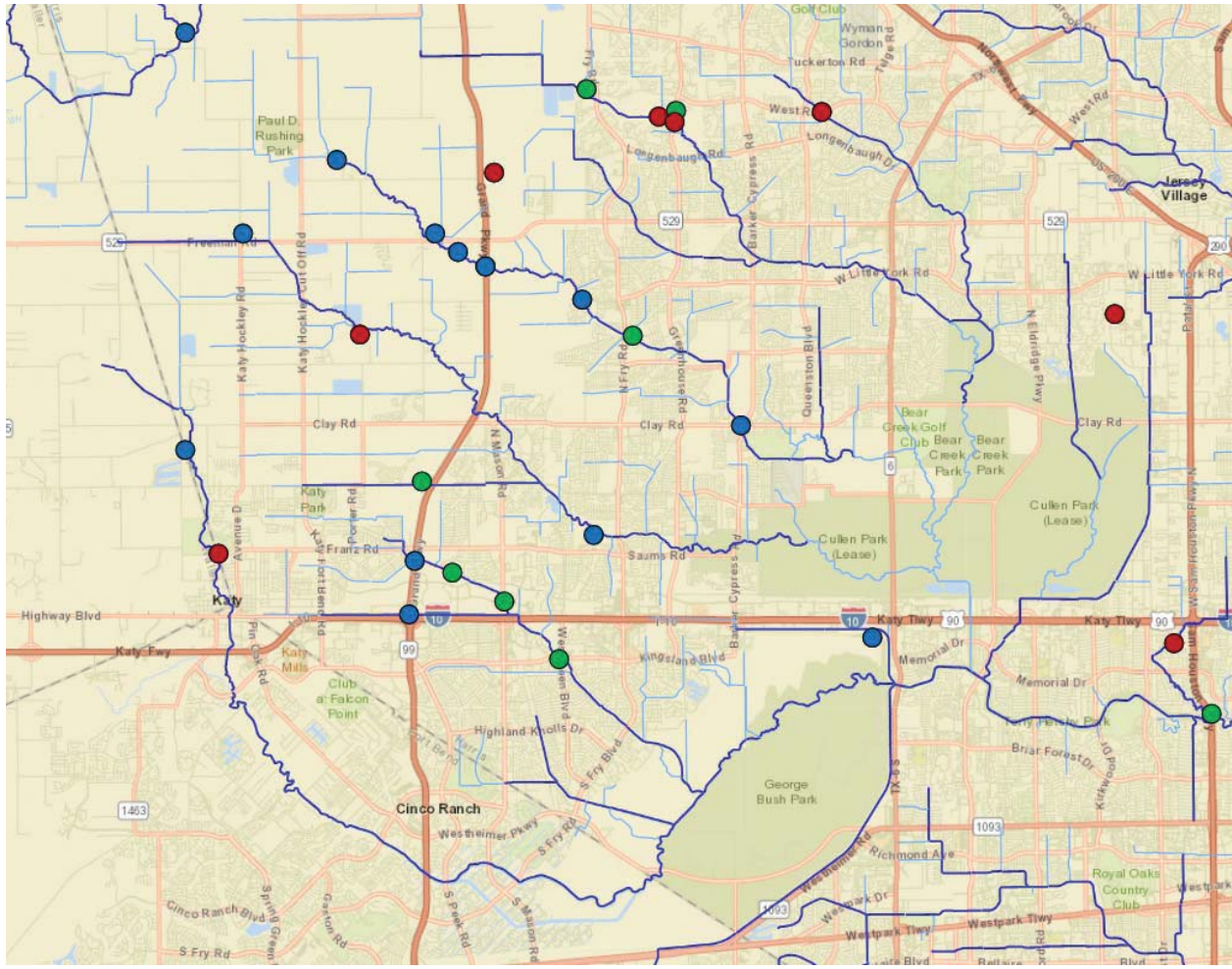


Figure 2-4: Acquired and utilized in the model (dark blue) and other (light blue) streams within the Focus Area upstream of the dams [11].

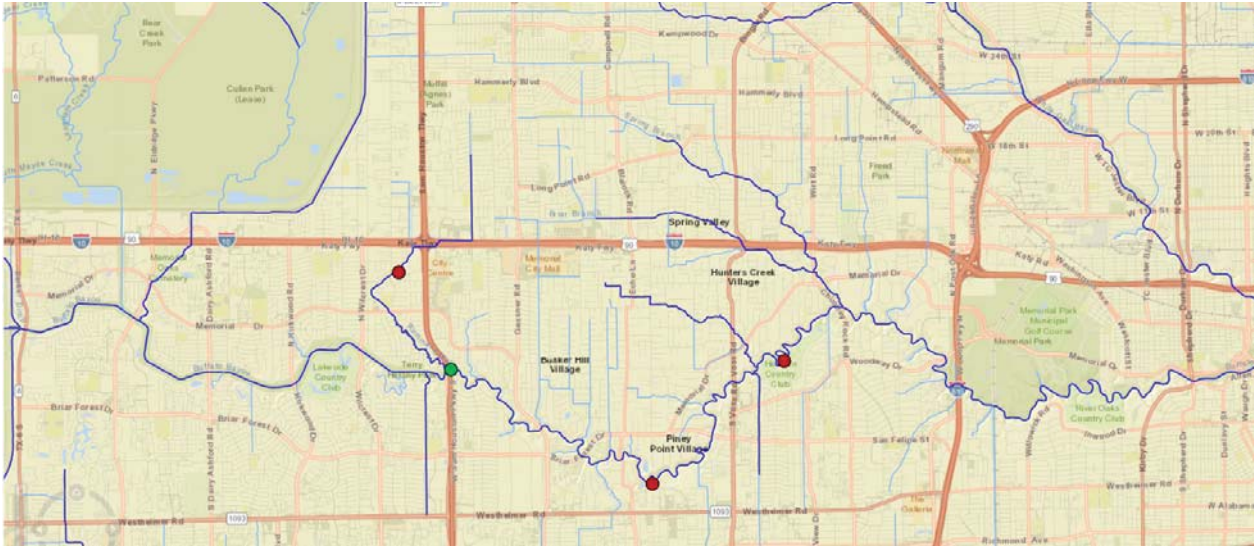


Figure 2-5: Acquired and utilized in the model (dark blue) and other (light blue) streams within the Focus Area downstream of the dams [11].

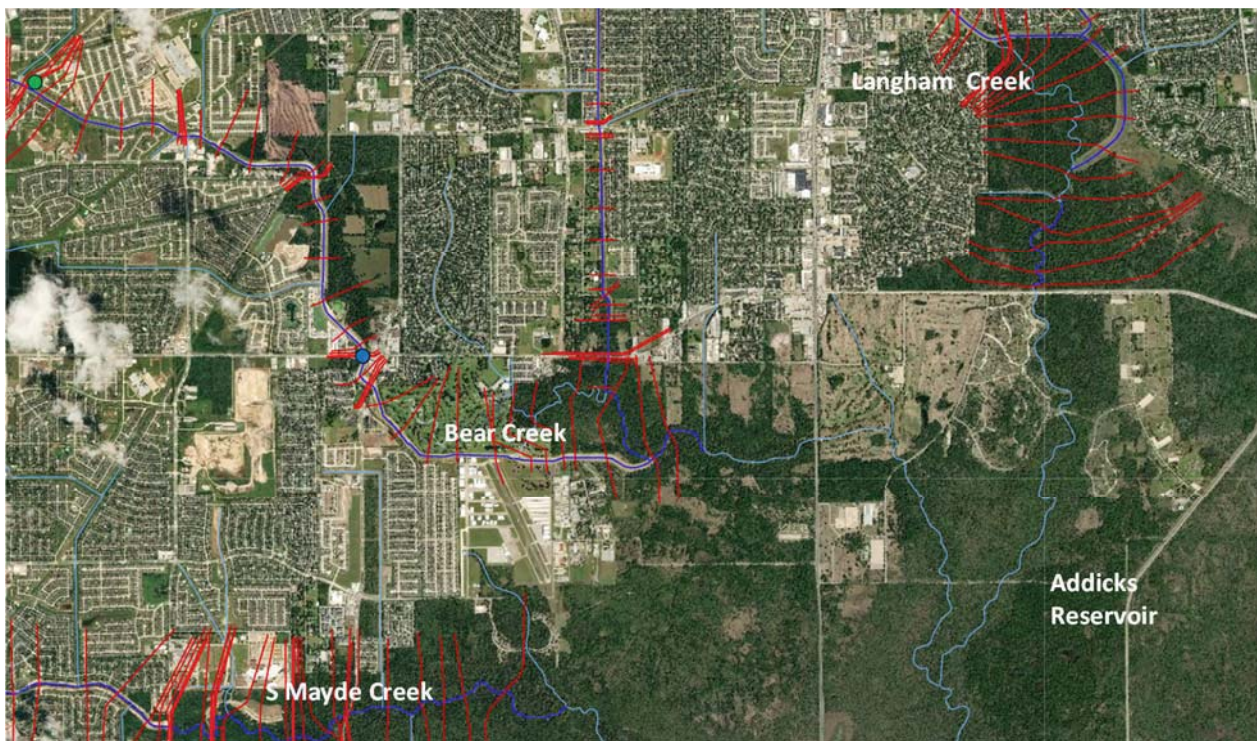


Figure 2-6: Examples of cross-sections from the HCFCR HEC-RAS models upstream of Addicks Reservoir [11].



Figure 2-7: Example of cross-sections from the HCFCF HEC-RAS models upstream of Barker Reservoir [11].

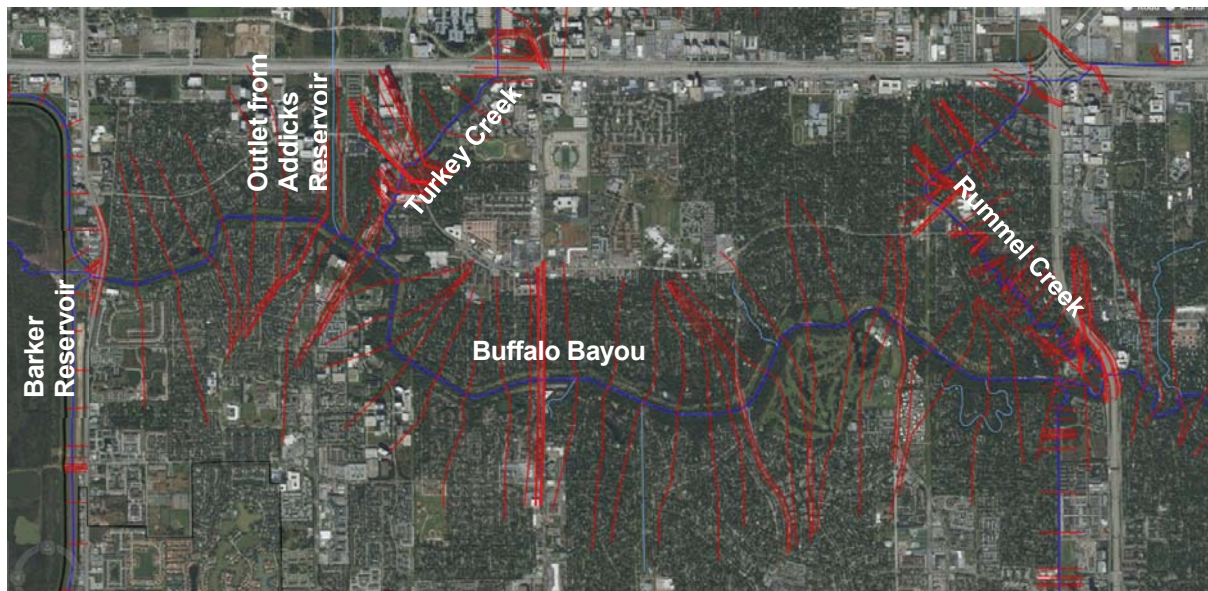


Figure 2-8: Example of cross-sections from the HCFCF HEC-RAS models [11].

2.4.2 2018 LiDAR Data

The topography of Lower Langham Creek (downstream of the Addicks outlets) is not covered by the HCFCD HEC-RAS models. The alternative to develop channel bathymetry was to rely on the 2018 LiDAR survey [12]. This LiDAR survey was conducted for the USACE, Galveston District between March 12 and 14, 2018 covering approximately 33 miles of the lower Buffalo Bayou [12]. During the period of the 2018 LiDAR survey, estimated discharge in Lower Langham Creek was less than 50 cfs (based on estimated discharges at USGS Gage 08073100 [13]), which is a relatively small discharge, corresponding to a maximum depth of 0.8 ft [13]. Therefore, the 2018 LiDAR survey is expected to represent the bottom elevation of Lower Langham Creek reasonably well.

2.5 Addicks and Barker Project

Congress authorized the Addicks and Barker dams project following the 1929 and 1935 flood events [7, p. USACE020188]. As part of the overall flood risk management project, Addicks and Barker Reservoirs assist in managing flood risk for the City of Houston and help prevent excessive velocities and silt deposits in the Houston Ship Channel Turning Basin [7, p. USACE020185].

Table 2.1 shows key dates of construction of relevance to the hydraulic study for Addicks and Barker Dams [7, p. USACE020189].

Table 2.1: Background of Structural Changes to Addicks and Barker Reservoirs.

Date	Construction Activity
Feb 1942 – Feb 1945	Barker reservoir, conduits and one gate.
Aug 1945	Barker initial operation
May 1946 – Dec 1948	Addicks reservoir, conduits and one gate.
Jun 1948	Addicks initial operation
Feb 1948 – Apr 1949	Two conduit gates added at each outlet.
Jan 1962 – Feb 1963	Gates added to the two remaining conduits at each outlet (for a total of 5 gated conduits)
Jun 1986 – Aug 1988	Main embankments raised by 1-2 feet in Addicks [7, p. USACE020194] and 2-3 feet in Barker [7, p. USACE020195]
1998 – 1999	Outlet structure renovations including electrical work and gate repair.
2015 - Present	Ongoing construction of new outlets at Addicks and Barker.

2.6 Sediment Loads

Between the completion of the Addicks and Barker Dams project and the 1973-1975 reservoir re-surveys, there was no evidence of appreciable erosion in the watershed above the dams or serious sedimentation issues in the reservoirs [7, p. USACE020196]. Since 1975, sediment loads of the streams flowing into Addicks and Barker reservoirs have substantially increased, which is attributed to construction activities associated with urbanization of the upper watershed [7, p. USACE020196].

2.7 Channel and Bayou Improvement Projects for Flood Reduction

Table 2.2 presents a summary of channel projects within the Focus Area approved by the federal government, including channel lining, rectification and diversion projects. The 1948 Rectification of Buffalo Bayou Project included straightening and widening of approximately 7.4 miles of the channel. Public opposition delayed another channel improvement project that was planned for Buffalo Bayou including concrete lining [7, p. USACE020190]. Table 2.2 shows approximate dates of these channel improvements (based on review of historic Google Earth satellite images).

The USACE permitted Harris County, Fort Bend County, and Willow Fork Drainage District to build seven major improvements on government owned reservoir land, as mapped out in Figure 2-9.

Table 2.2: Summary of Channel Projects within the Focus Area

Date Completed	Channel Project Description
Downstream Channels	
1948	Rectification of ~7.4 miles of Buffalo Bayou immediately downstream of the dams [7, p. USACE020190].
1971	Channel improvements for 25.4 miles of Brays Bayou (straightening and enlarging along with concrete lining) [7, p. USACE020190].
1975	Channel improvements for 10.7 miles of White Oak Bayou (straightening and enlarging along with concrete lining) [7, p. USACE020190].
1976	HCFCF excavated Turkey Creek Ditch below Addicks Dam [7, p. USACE020191].
1986 - 1988	Main earth embankments of Addicks and Barker Dams were raised to 121 ft and 113.1 ft, respectively [7, pp. USACE020194, USACE020195].
7 major upstream channel improvements (refer to Figure 2-9)	
1944 – 1977*	Willow Fork Creek Improvement – Stage 1
1944 – 1977*	Tributary 52.9 to Buffalo Bayou
1944 – 1977*	Drainage Improvement to Bear Creek Village
1977 – 1988*	Willow Fork Creek Improvement – Stage 2
1977 – 1988*	Willow Fork Diversion Channel
1977 – 1988*	Mason Creek Improvement
1977 – 1988*	Langham/Horsepen Creek Diversion
1995 – 2002*	Bear Creek Diversion

* based on review of historic Google Earth Images.



Figure 2-9: Seven major channel improvement projects upstream of and within Addicks and Barker Reservoirs.

2.8 Historical Storms and Floods

At the time of drafting the 2012 Water Control Manual [7], the maximum known flood on Buffalo Bayou was the 1935 flood [7, p. USACE002216]. During this flood, overflow occurred from White Oak Bayou into Buffalo Bayou, which overflowed into Brays Bayou [7, p. USACE002216]. The estimated peak flow rates in Buffalo Bayou were 40,000 cfs at Waugh Drive⁴ and 53,000 cfs at the confluence with White Oaks Bayou. The maximum recorded peak discharge in Buffalo Bayou, since establishment of gaging stations, was 14,000 cfs at Shepherd Drive in June 2001 [7, p. USACE002216]. A comparison between the Harvey Event and the 1935 flood is provided in Section 3.1.

⁴ Approximately 3.5 miles east of Highway 610, about 25 stream miles below the reservoirs.

2.9 Rainfall Data (Hurricane Harvey)

We downloaded precipitation data for the Harvey Event for 162 stations in hourly and 15-minute intervals from the Harris County Flood Warning System website [14]. We reviewed all the downloaded data and marked inconsistent records of rainfall data as missing data. We identified inconsistent records by comparing rainfall data at each station with neighboring stations and digitized locations of rainfall stations from the Harris County Flood Warning System (HCFWS) map [14].

In addition to gage data, Applied Weather Associates (AWA) applied the Storm Precipitation Analysis System to describe the rainfall during the Harvey Event using available sources [15]. The outcome of this analysis was provided as 60-minute rainfall data gridded at a spatial resolution of 0.01 seconds of latitude/longitude (approximately 1 km² resolution).

2.10 Wind Data (Hurricane Harvey)

As part of its Storm Precipitation Analysis System evaluation, AWA provided gridded wind data corresponding to the Harvey Event, where wind speed, direction and atmospheric pressure data were provided as gridded 60-minute data at a spatial resolution of 0.01 seconds (1 km²) [15].

2.11 Addicks and Barker Reservoirs

2.11.1 Objective of the Reservoirs

Addicks and Barker Reservoirs “were designed by the USACE to reduce flood flows downstream in Buffalo Bayou through the City of Houston” [16, p. USACE016461] and to protect urban developments in the downstream floodplain [16, p. USACE016457].

When the reservoirs were completed by December 1948⁵, they were 15 miles west of the city limits of Houston [16, p. USACE016461]. Now, these reservoirs are part of the City of Houston and substantial urban development is located upstream and next to the federally acquired lands [16, p. USACE002356].

2.11.2 Reservoir Storage and Drainage Characteristics

As outlined earlier, the objective of the Addicks and Barker dams is to reduce flood risks in the downstream floodplain [16, p. USACE016457]. As such, the Addicks and Barker Reservoirs are designed for short-term storage during storm conditions. The storage capacities of Addicks and Barker Reservoirs within the GOL are 127,591 Acre-feet (41.6 billion gallons) [16, p. USACE016576] and 82,921 acre-feet (27 billion gallons) [16, p. USACE016578], respectively.

In the 1962 Reservoir Regulation Manual, the Corps estimated that the maximum non-damaging channel capacity downstream of the reservoirs was about 6,000 cfs [17, p. USACE599481]. At this rate, it takes 16 days for floodwater to discharge from the reservoirs if water surface elevation is at SPF elevations, assuming no additional rainfall and resultant runoff during releases [17, p. USACE599485]. The 2012 Water Control Manual states “present non-damaging channel capacity is approximately 3,000 cfs. Releases, when combined with uncontrolled runoff and outflow from Addicks and Barker Reservoirs, are limited to 2,000 cfs due to serious embankment problems and impacts to privately owned land.” [7, p. USACE020213].

⁵ Construction of Barker dam was completed in February 1945 [7, p. USACE020189], while construction of Addicks dam was completed in December 1948 [7, p. USACE020190].

2.11.3 Historical Pool Elevations

From the start of operation of the dams in 1948 until the time of drafting the Water Control Manual in 2012, the maximum impoundments behind the reservoirs occurred in March 1992 with pool elevations of 97.46 feet (Addicks) and 93.6 feet (Barker) [7, p. USACE002216]. Table 2.3 provides elevations in descending order for the top 12 significant pools for Addicks and Barker Reservoirs prior to the Harvey Event.

During Hurricane Harvey, pool elevations in Addicks and Barker Reservoirs reached 109.09 feet and 101.59 feet NAVD88 on the morning of 08/30/2017 exceeding the Standard Project Flood elevations (107.5 feet and 99 feet, respectively).

Table 2.3: Top 12 pool elevations for Addicks and Barker Reservoirs prior to the Harvey Event [7, pp. USACE002241-2]

Date	Pool Elevation at Addicks Reservoir (ft NAVD88)	Pool Elevation at Barker Reservoir (ft NAVD88)
25 – 29 Aug 2017 Harvey Event*	109.09	101.59
23 – 25 April 2016 Tax Day*	102.65	95.25
9 Mar 1992	97.46	93.60
30 Apr 2009	96.90	93.24
7 Nov 2002	96.45	92.31
17 Nov 1998	95.70	91.85
23 Oct 1994	95.63	91.69
31 May 2015* Memorial Day	95.52	91.87
15 May 1968	95.16	91.34
25 Nov 2004	94.88	91.21
8 Jul 2007	94.82	90.60
4 Sep 1981	94.25	90.58
17 Sep 1998	93.95	90.54

* Based on review of USGS gage data [13].

2.11.4 Releases

In accordance with the 2012 Water Control Manual [7, p. USACE020214], Section 7-05.b (Induced Surcharge Flood Control Regulation), *“At any time the reservoir pool equals or exceeds 101 feet NAVD 1988 in Addicks Reservoir and 95.7 feet NAVD 1988 in Barker Reservoir monitoring of pool elevation should immediately ensue to determine if inflow is causing pool elevation to continue to rise. If inflow and pool elevation conditions dictate, reservoir releases will be made in accordance with the induced surcharge regulation schedules shown on plates 7-03 and 7-04. The gates should remain at the maximum opening attained from the induced surcharge regulation schedules until reservoir levels fall to elevation 101 feet NAVD 1988 in Addicks and 94.9 feet NAVD 1988 in Barker. Then, if the outflow from both reservoirs when combined with the uncontrolled*

runoff downstream is greater than channel capacity, adjust the gates until the total discharges do not exceed channel capacity and follow the normal operating procedures.”

During the Harvey Event, USACE operated the Addicks and Barker dams in accordance with the induced surcharge schedule. There were three distinctive phases to the releases from Addicks and Barker Reservoirs during the Harvey Event. In the first phase, between 8/28/2017 at 1:00 and 8/28/2017 at 8:00, the releases were increased to a combined rate of approximately 6,000 cfs. Between 8:00 on the 28th of August and 7:00 on the 29th there was only a small increase in the rate of combined release to 6,900 cfs. In the third phase, from 7:00 on the 29th until 15:00 that day, the release was increased to a combined rate of approximately 13,000 cfs. The first and third phases, where the releases were ramped up, resulted in two distinctive flood waves moving downstream through Buffalo Bayou. Table 2.4 summarizes the sequence of events during the Focus Period.

Table 2.4: Sequence of Events

Date	Rainfall [14]	Pool Elevations in Addicks / Barker (ft, NAVD88)	Gate Operation	Approximate Rate of Release from Addicks / Barker (cfs)*
8/20/2018 to 8/25/2017	Light scattered rain prior to Hurricane Harvey landfall	(87 to 67) / (84 to 72)	Gates partially open to empty the reservoirs and to release incoming inflows.	(0 – 200) / (0 – 200)
8/25/2017 am	Start of Harvey Event's rainfall (light rain)	67 / 72	Gates partially open to empty the reservoirs and to release incoming inflows.	(0 – 200) / (0 – 200)
8/25/2017 21:00	Light rain	72.4 / 72.9	Addicks gates closed	0 / 0
8/25/2017 22:00	Light rain	73.8 / 74.1	Barker gates closed	0 / 0
8/26/2017 am to 8/28/2017 am	Intense rainfall	(75 to 101) / (75 to 96)	Addicks and Barker gates closed	0 / 0
8/28/2017 1:00	Less intense rainfall	101.3 / 96.0	Start of gradual opening of Addicks gates (creates first flood wave)	(0 – 3000) / 0
8/28/2017 2:00	Less intense rainfall	101.7 / 96.3	Start of gradual opening of Barker gates (creates first flood wave)	(0 – 3000) / (0 – 3000)
8/28/2017 pm to 8/29/2017 am	Less intense rainfall	(104 to 107) / (98 to 100)	Gradual opening stopped, and gate	3000 / 3000

			position held for both sets of gates	
8/29/2017 am to 8/29/2017 pm	End of rainfall around 8/29/2017 17:00	(107 to 109) / (100 to 102)	Gate opening resumed at both reservoirs (creates second flood wave) ⁶	7000 / 6000
8/30/2017 16:00	No measurable rainfall	109.1 / 101.5	Start of gradual closure of Addicks gates	< 7000 / 6000
8/31/2017 20:00	No measurable rainfall	108.7 / 100.9	Start of gradual closure of Barker gates	< 7000 / < 6000

* [7, p. USACE020314, USACE020315], [18], [19]

2.12 Plaintiffs and Test Plaintiffs

Figure 2-10 maps out the upstream and downstream Test Plaintiffs and major streams within the Focus Area. Inundation damages at the Plaintiffs properties could have resulted from several factors as summarized below:

- Excessive runoff from local rainfall that overwhelmed the local storm drainage system;
- Backwater due to high water surface elevations in the receiving water body (such as pool elevations in Addicks or Barker Reservoirs);
- Backwater due to channel constriction in streams/bayous; and/or
- Release of floodwater from Addicks and Barker Reservoirs.

Table 2.5 provides a list of upstream Test Plaintiffs along with a general description of their properties' locations with respect to the dams and the major streams.

Table 2.6 summarizes results of land surveys completed at the upstream Test Properties [20].

Table 2.5: General description of upstream Test Properties.

Test Plaintiff	Reservoir	General location with respect to gages and water bodies
Lakes on Eldridge	Upstream Addicks	On the northern side of the reservoir.
Wind, Kurt & Jean	Upstream Addicks	On the northern side of the reservoir.
Mitchell, Stewart	Upstream Addicks	On the western side of the reservoir between Langham and Bear Creeks.
West Houston Airport Corp.	Upstream Addicks	On the western side of the reservoir between South Mayde and Bear Creeks.
Mitchell, Mario	Upstream Addicks	On South Mayde Creek, approximately 5000 yards upstream of the reservoir.

⁶ Maximum release/flow rate during the Event was less than the maximum capacity of the conduits.

Burnham, Elizabeth	Upstream Addicks	On the western side of the reservoir, close to Langham Creek.
Sidhu, Kulwant	Upstream Addicks	On the western side of the reservoir close to Langham Creek.
Turney, Robert	Upstream Addicks	On the western side of the reservoir close to Langham Creek..
Holland, Scott	Upstream Addicks	On the western side of the reservoir, approximately 700 yards north of the southern auxiliary spillway.
Popovici, Catherine	Upstream Barker	On the western side of the reservoir between Mason Creek Improvement and Tributary 52.9 and 4 (refer to Figure 2-9).
Soares, Elisio	Upstream Barker	On Westheimer Parkway.
Micu, Christina	Upstream Barker	370 yards north of Barker's southern auxiliary spillway.
Giron, Juan & Ann	Upstream Barker	On the improved section of Upper Buffalo Bayou.
Banker, Todd & Christina	Upstream Barker	On the edge of the GOL north of the improved Upper Buffalo Bayou.

Table 2.6: Results of land surveys at upstream Test Plaintiffs [20]

Plaintiff	Elevation (ft)					Source
	Lowest Grade	Garage Elevation	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor*	
Lakes on Eldridge	106.3	-	108.4	108.9	-	US0000450
Wind, Kurt & Jean	106.9	108.6	108.2	109.2	109.3	US0000447
Mitchell, Stewart	105.7	108.5	108.0	109.0	-	US0000442
West Houston Airport Corp.	106.6	-	107.5	108.6		US0000425
Mitchell, Mario	119.9	121.5	121.1	121.9	-	US0000441
Burnham, Elizabeth	102.6	105.0	104.0	105.5	-	US0000452
Sidhu, Kulwant	105.1	-	106.3	107.1	116.7	US0000445
Turney, Robert	101.7	104.2	103.8	104.7	-	US0000443
Holland, Scott	106.1	107.4	107.2	107.8	-	US0000453
Popovici, Catherine	99.6	101.7	100.9	102.2	-	US0000448

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Soares, Elisio	98.7	100.7	100.0	101.1	-	US0000444
Micu, Christina	97.7	99.6	98.9	99.8	-	US0000449
Giron, Juan & Ann	99.0	101.0	100.2	101.0	101.5	US0000440
Banker, Todd & Christina	97.6	100.2	99.6	100.7	-	US0000446

* Other finished floor elevation surveyed.

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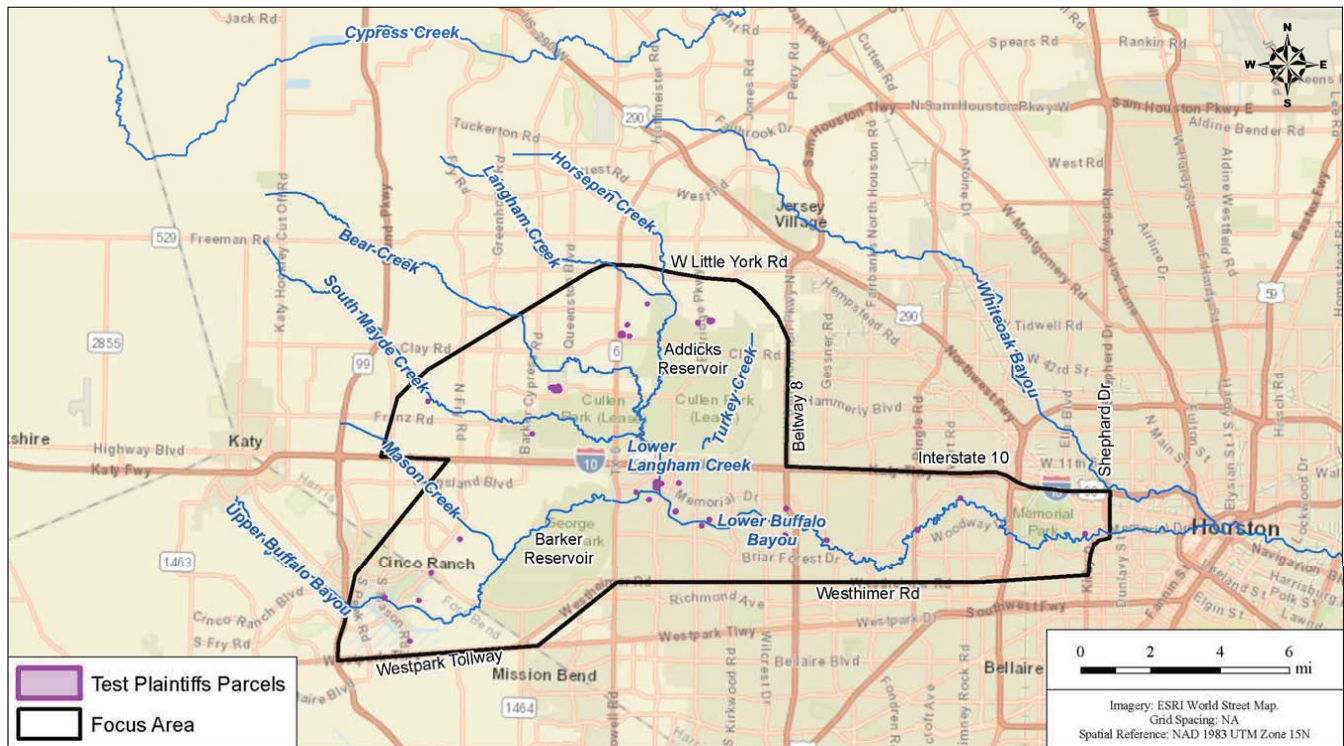


Figure 2-10: Focus Area vicinity map showing locations of Test Plaintiffs and major streams. Upstream Test Plaintiffs are identified in Figure 2-1.

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3. Analysis of Physical Data

This section presents analysis of physical data collected during the Harvey Event (i.e. stream gage data) and historically (i.e. flow rating curves) to develop a general understanding of the flow regime during the event and to estimate general characteristics of the main streams within the Focus Area. Figure 3-6 shows locations of stream gages within the Focus Area which have been reviewed and analyzed in this section.

3.1 Inflow to Addicks and Barker Reservoirs

The Corps determined the Standard Project Flood (SPF) elevations based on a design flood that generates peak runoff inflows of 29,585 cfs and 22,405 cfs into Addicks and Barker, respectively (1962 Water Control Manual [17, pp. USACE599515-599516]). These peak inflows are greater than the estimated runoff during the 1935 flood, which was the storm of record at the time of designing the Addicks and Barker dams (refer to Table 3.1).

The capacity rating tables documented in the Corps' 2012 Water Control Manual [7] were used to estimate volume of floodwaters in the reservoirs during the Event. USGS measurements of pool elevations in Addicks and Barker Reservoirs [13] (USGS Stations 08073000 (Addicks) and 08072500 (Barker)) were used to define the free surface elevations in the reservoirs. We estimated the inflows to Addicks and Barker Reservoirs during the Harvey Event based on the mass balance within the reservoirs as two separate control volumes. The releases from Addicks and Barker Reservoirs were included in the mass balance; but floodwater stored upstream of the reservoirs (i.e. in upper tributaries and low-lying areas) was not included. As such, inflows estimated using this methodology are expected to be less than the peak flows generated upstream of the reservoirs during the Harvey Event. The spill around the north end of Addicks dam was not included in the mass balance. As such, inflows to Addicks Reservoir are slightly underestimated. The Harvey Event generated peak inflows of at least 72,000 and 88,000 cfs to Addicks and Barker Reservoirs, respectively, as shown in Figure 3-1. Harris County [4] reported a peak maximum inflow of 72,200 cfs into Addicks Reservoir during the Harvey Event, not including inflows from Horsepen Creek, which is consistent with the estimated inflows provided in Figure 3-1. As shown in Table 3.1, peak inflow rates generated during the Harvey Event are 2 to 4 times the 1962 SPF inflows.

In 1977, the Corps recalculated the SPF hydrographs for Addicks and Barker Reservoirs based on 50% of the Probable Maximum Precipitation (PMP) [21, p. USACE000549]. The revised SPF inflow hydrographs have peak inflow rates of 124,094 cfs and 86,961 cfs for Addicks and Barker Reservoirs, respectively. Although the estimated peak inflow rates during Harvey are smaller than the revised SPF, the Harvey inflow hydrographs are longer than the SPF duration. The calculated total cumulative inflows to Addicks and Barker Reservoirs during the Harvey Event are larger than the 1977 SPF, as shown in Table 3.1. Figure 3-2 and Figure 3-3 compare between inflow hydrographs under Harvey Event, 1962 SPF, 1977 SPF and 1935 flood for Addicks and Barker Reservoirs, respectively. Figure 3-4 and Figure 3-5 show estimated cumulative inflows to Addicks and Barker during Harvey Event, 1977 SPF and 1962 SPF.

The focus of our investigation relates to the hydraulic design and performance of the Addicks and Barker Reservoirs which is based on the SPF. Whereas the Spillway Design Flood (SDF) relates to the structural and geotechnical design of the embankments associated with the two reservoirs. The Corps noted in the 2012 Water Control Manual that the 1977 SDF produces "flow over the embankments of both dams" [7, p. USACE020212]. "The occurrence of this situation could create a condition favorable for considerable property damage to the public and the possible loss of life. Spillway Design Flood Impacts are currently being reanalyzed as part of a Dam Safety Modification Study and [the 2012 Water Control Manual] will be updated with results from the study after it is reviewed and approved." [7, p. USACE020212].

The maximum combined capacity of the Addicks and Barker release conduits is 16,586 cfs [16, p. USACE016577 and USACE016579], which is greater than the capacity of the receiving channel. Floodwater inflow rates to Addicks and Barker Reservoirs reached at least 160,000 cfs, which is an order of magnitude larger than the maximum combined capacity of the release conduits, leading to an unavoidable rapid rate of rise of pool elevations in Addicks and Barker Reservoirs. Due to the order of magnitude difference between the inflows to and outflows from the reservoirs, the pool elevations inside the reservoirs are not manageable without significant releases⁷ during events similar to the Harvey Event.

Table 3.1: Summary of design flood peak inflows compared to the Harvey Event peak inflows

Storms (listed according to severity from lowest to highest cumulative inflows)	Peak inflow to Addicks (cfs)	Peak inflow to Barker (cfs)	Total cumulative inflow to Addicks (Acre ft.)	Total cumulative inflow to Barker (Acre ft.)
1935 Flood [17, p. USACE599518, USACE599520]	23,000	17,915	82,727**	87,533**
1962 Standard Project Flood (SPF) [17, pp. USACE599515-599516]	29,585	22,405	85,414**	85,754**
100 year flood frequency [16, p. USACE016576 and USACE016578]			94,500	82,921
1977 Standard Project Flood [21, p. USACE000559]	124,094	86,961	193,956	125,061
Harvey Event*	72,000	88,000	250,000	200,000

* Peak inflows and total cumulative inflows are calculated based on volume of floodwater in the reservoirs and the released amount of water through the conduits. Estimates do not include water stored in upper tributaries and low lying areas upstream of the reservoirs and floodwater spilled around the north end of Addicks.

** Calculated based on digitized inflow hydrographs provided by the 1962 Reservoir Regulation Manual [17].

⁷ Significant releases exceeding the capacity of the release conduits and the receiving channels downstream of the dams.

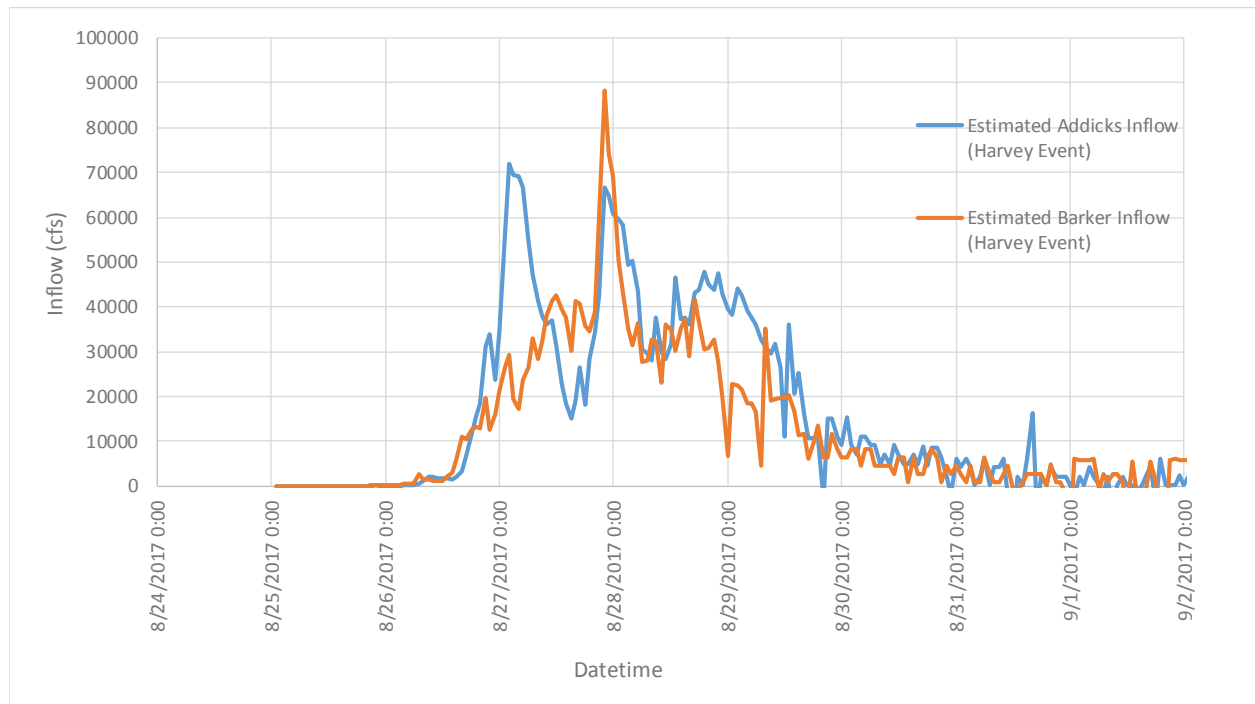


Figure 3-1: Addicks and Barker inflow hydrographs during Harvey Event.

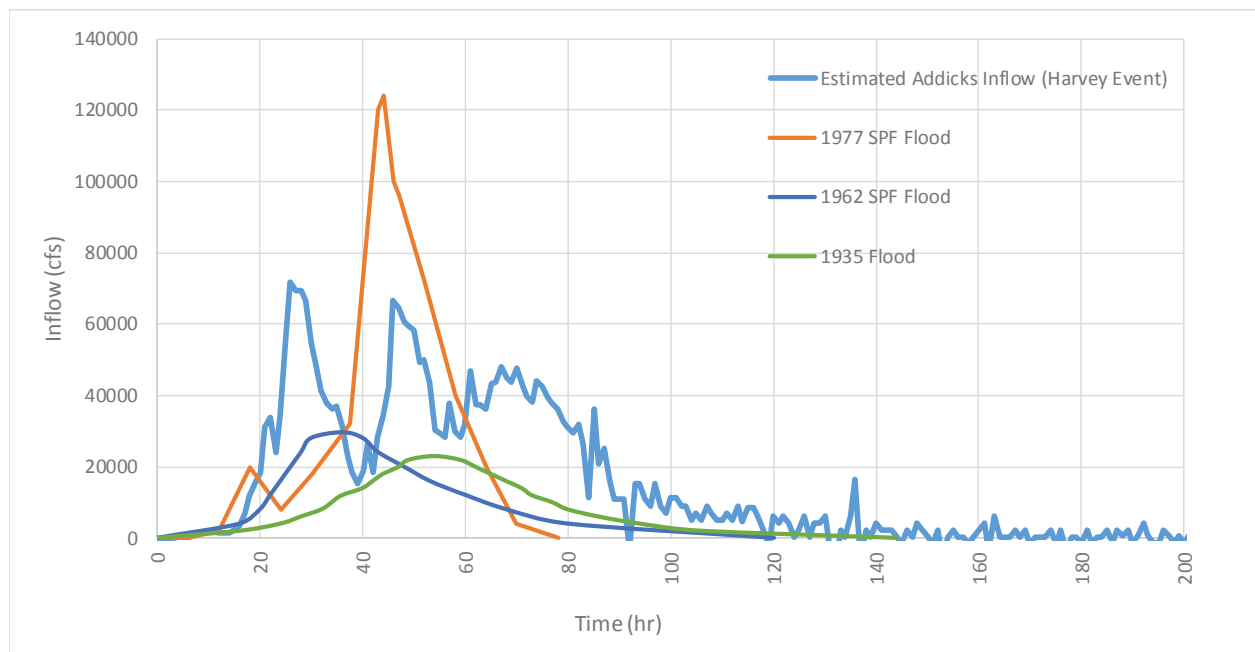


Figure 3-2: Harvey Event, 1977 SPF, 1962 SPF and 1935 event inflow hydrographs to Addicks Reservoir.

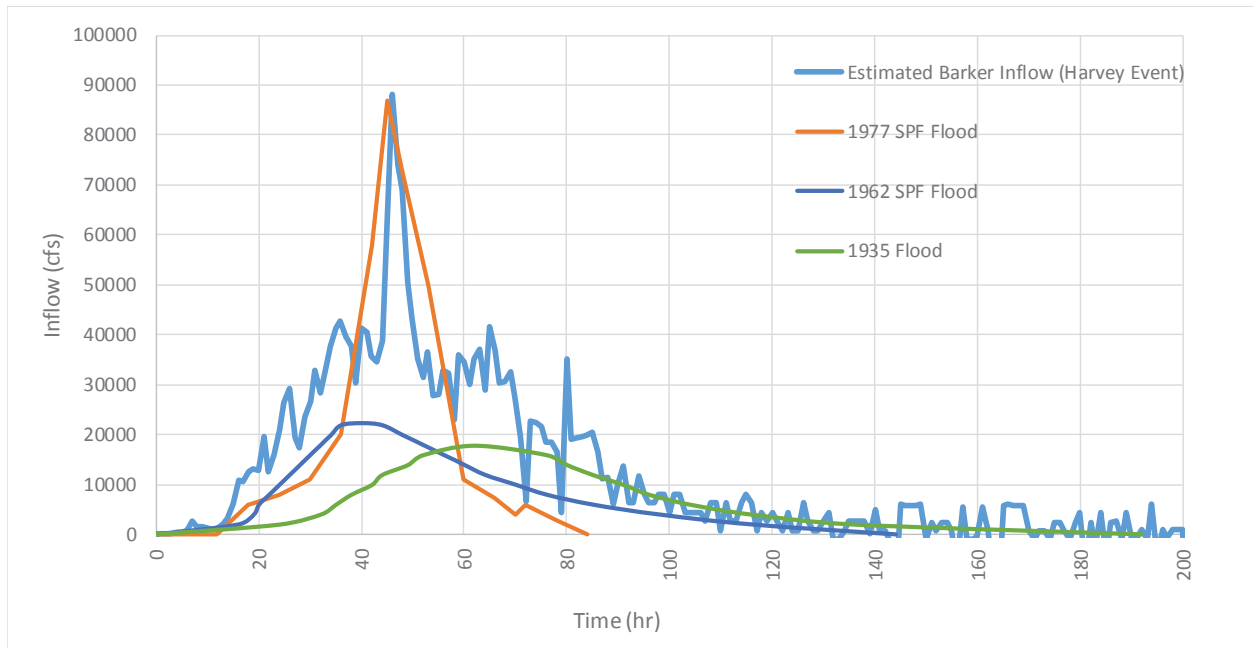


Figure 3-3: Harvey Event, 1977 SPF, 1962 SPF and 1935 event inflow hydrographs to Barker Reservoir.

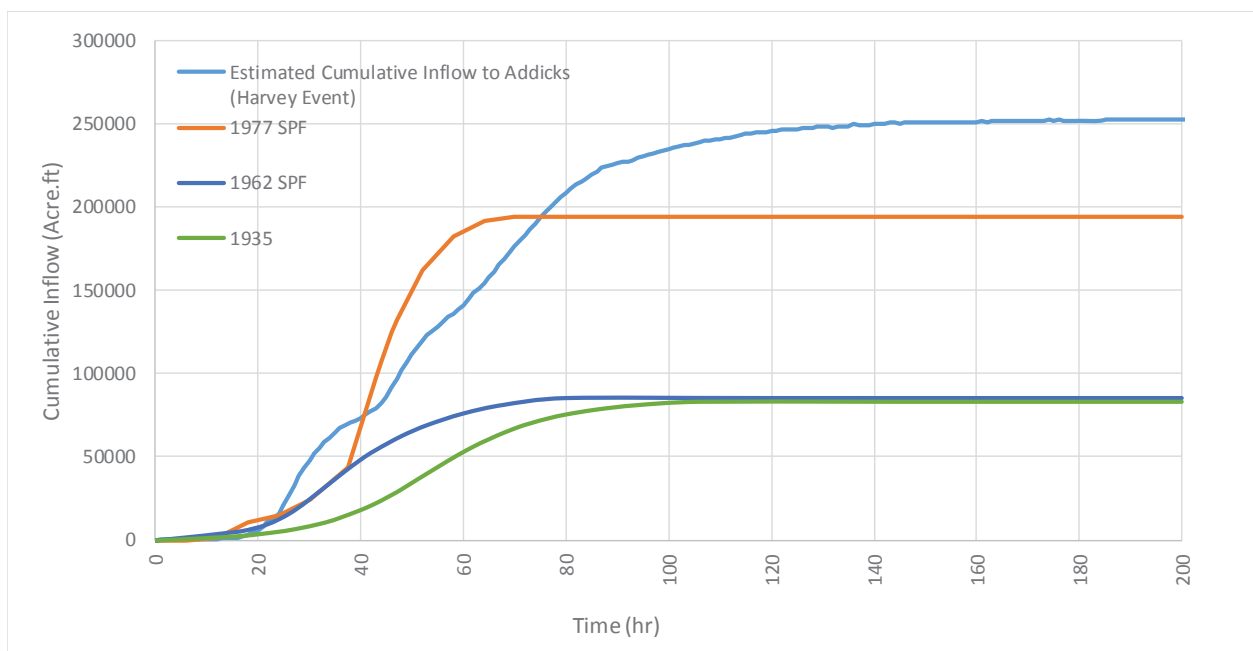


Figure 3-4: Cumulative inflow volumes to Addicks Reservoir (Harvey Event, 1977 SPF and 1962 SPF)

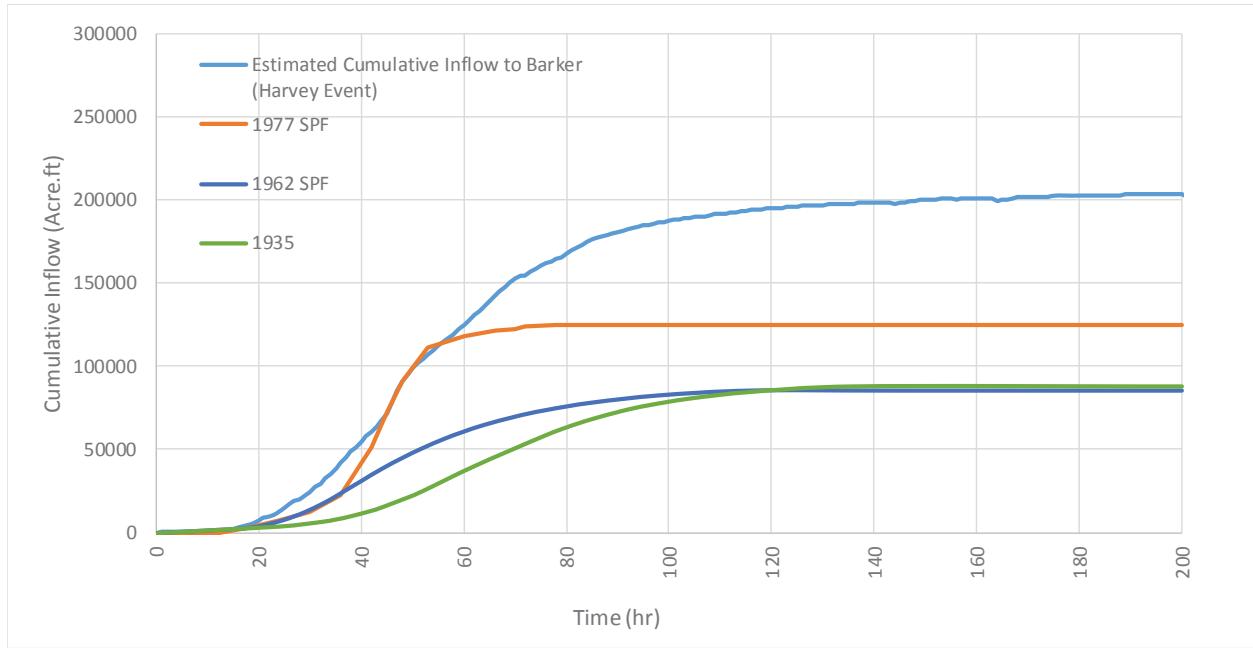


Figure 3-5: Cumulative inflow volumes to Barker Reservoir (Harvey Event, 1977 SPF and 1962 SPF)

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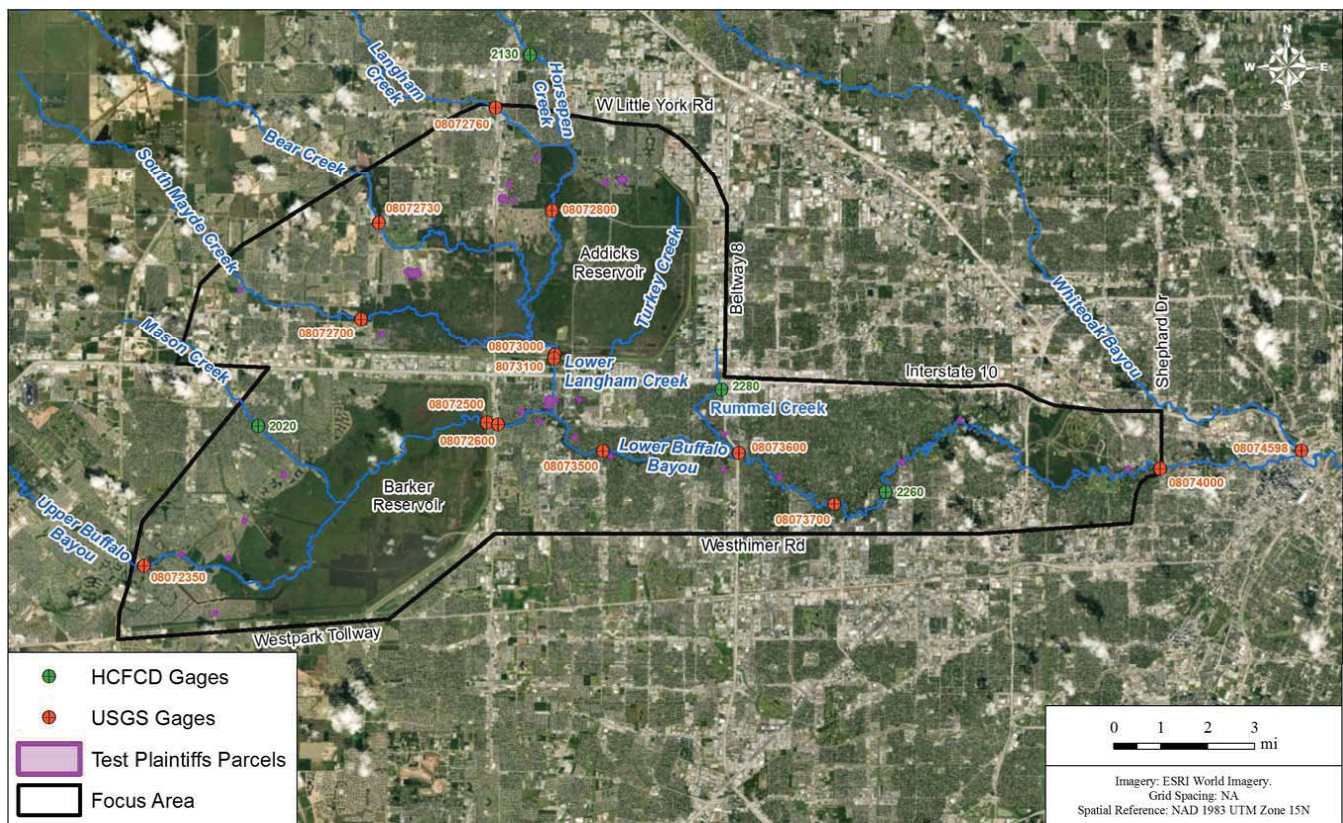


Figure 3-6: Stream gages within the Focus Area.

Addicks and Barker Flood Control Reservoirs - Upstream Hydraulic Study
Expert Report of Dr. R. Naim (Upstream)

Baird.

3.2 Flow Regime Upstream of Addicks and Barker Dams

This section describes flow regime upstream of the dams based on stage and discharge measurements at various gage locations prior to and during the Harvey Event.

3.2.1 Prior to the Harvey Event

There are two main streams draining into Barker Reservoir: Upper Buffalo Bayou and Mason Creek. Figure 3-7 shows measured stage elevations at two locations on upper Buffalo Bayou and pool elevations in Barker Reservoir. The Corps closed the gates on 8/25/2017 at 22:00 in preparation for the Harvey Event. Prior to closing the gates, the Corps released water from Barker Reservoir, which rapidly dropped the pool elevation down to 73 ft, approximately the bottom of Barker Reservoir (71.05 ft NAVD88), which is slightly higher than the invert elevation of the conduits (70.2 ft NAVD88). Despite the relatively rapid drop (average of 5.3 ft/day) in pool elevations between 8/20/2017 and 8/22/2017, stage elevations in upper Buffalo Bayou do not seem to be influenced by this drop. This indicates that a backwater condition existed in upper Buffalo Bayou for that time period.

Similar trends are observed in Addicks Reservoir as shown in Figure 3-8.

3.2.2 Gate Closure Period

During the gate closure period between 8/26/2017 and 8/28/2017, the peak rainfall intensity of the Harvey Event was recorded (up to 2.5 inch/hr). Heavy rainfall on urbanized areas resulted in runoff and flow through streams towards Addicks and Barker Reservoirs, where pool elevations rose rapidly. Figure 3-7 shows stage elevations along upper Buffalo Bayou and pool elevations in Barker Reservoir. USGS gage 08072350 is located just upstream of the Willow Fork diversion channel, which is approximately 1.1 miles upstream of the Barker gates. The stream distance between USGS gages 08072300 (upstream of the Focus Area and not pictured on Figure 3.4) and 08072350 (the Willow Fork gage) is approximately 3 miles. On 8/25/2017 at 18:00, the stream flow was less than 20 cfs⁸ indicating no significant runoff in the upper Buffalo Bayou catchment area. In addition, the pool elevation in Barker Reservoir was very low (approximately 73 ft). Under these conditions of low flow (i.e. contained within the main stream) and low pool elevation in the reservoir (i.e. precluding backwater effects caused by high pool elevations), uniform flow is expected to develop, where the slope of the water surface profile along the stream is expected to be similar to the slope of the stream bed, unless the stream was constricted or blocked downstream of this reach creating a backwater effect. A stream constriction or blockage could be caused by channel siltation or accumulation of debris. The stream bed slope between these two gages is approximately 1(v):1,200(h)⁹. Based on the measured stage elevations, water surface profile slope between these two gages was much flatter than the bed slope (approximately 1(v):2,250(h)) on 8/25/2017 18:00 prior to the start of the intense rainfall/runoff period. As such, we conclude based on the stage measurements, that relatively low flows through upper Buffalo Bayou are likely impacted by constrictions, siltation or debris close to the stream bed, causing backwater.

On 8/28/2017 2:00, after the 2-day period of the most intense rainfall, the slope of the water surface profile between USGS gages 08072300 and 08072350 was 1(v):1,120(h), which is close to the slope of the stream bed. At this point in time, the flow rate through Upper Buffalo Bayou was approximately 17,000 cfs. Between 8/25/2017 22:00 and 8/28/2017 2:00, while gates were closed, the pool elevation in Barker Reservoir rose rapidly from 73 ft to 96.3 ft at a rate of more than 11.65 ft/day. Despite this rapid rise in pool elevation, the water surface profile slope in Upper Buffalo Bayou gradually changed from being flatter than the stream bed

⁸ Based on stage-discharge rating curve for USGS gage 08072300 provided by [22]

⁹ Based on 2008 DEM data.

during the initial period of low flow conditions, to being close to the stream bed slope during the period of peak flow conditions (refer to Figure 3-7). This suggests that the rapid rise of the Barker pool elevation (up to elevation 96.3 ft) did not cause backwater in Upper Buffalo Bayou since water surface slopes along the bayou have steepened despite the rapid pool elevation rise.¹⁰ Stream constrictions also have only impacted low flow regimes along Upper Buffalo Bayou.

At Addicks Reservoir, conditions resembled those in Barker Reservoir during the period of most intense rainfall and gate closure. This period (between 8/26/2017 and 8/28/2017) was characterized by rapid rise in pool elevation, relatively high flows through upper tributaries with no sign of backwater due to high pool elevations in Addicks Reservoir (refer to Figure 3-8).

3.2.3 Gradual Release Period

The Corps began releasing water from Barker Reservoir gradually on 8/28/2017 2:00 and reached maximum release¹¹ (5 gates open at 5 ft-height) on 8/29/2017 15:00. During this period, less intense rainfall (less than 0.5 in/hr) was measured and pool elevation in Barker Reservoir rose from 96.3 ft to 101.43 ft at a rate of 3.16 ft/day. As shown in Figure 3-7, during this period water surface profile slopes between USGS gages 08072300 and 08072350 gradually decreased. The flatter water surface elevation profiles developed as a result of increasing water surface elevations at USGS gage 08072300 and increasing water surface elevation in Barker Reservoir. Stage elevations at USGS gage 08072350 (close to the reservoir) were nearly constant in time, which indicates backwater conditions due to high pool elevations in Barker Reservoir. Despite the release from the Barker gates, the inflow rate (more than 17,000 cfs from upper Buffalo Bayou alone) was much larger than the release rate during that period (which gradually increased to approximately 6,000 cfs). At the same time, pool elevations in Barker Reservoir rose to elevations beyond the GOL. Under these conditions, backwater in the upper tributaries is evident, where the stage-discharge rating curves become invalid (i.e. as water surface elevation may be backed up and rose without increase in flow rate).

Conditions upstream of Addicks Reservoir resembled those in Barker Reservoir during the gradual release period. This period, between 8/28/2017 1:00 and 8/29/2017 15:00, was characterized by increasing pool elevations in Addicks Reservoir, stabilized water surface elevations in streams close to the edge of the reservoir (USGS gages 08072760 and 08072680 on Langham and South Mayde Creeks, respectively) and decreasing water surface elevations in the upper streams draining into the reservoir (HCFCD 2140 on Langham Creek).

3.2.4 Maximum Release Period

During the period of maximum gate release from Barker Reservoir between 8/29/2017 17:00 and 8/31/2017 20:00, there was very little to no rainfall across the watershed. During this period, the pool elevation in Barker Reservoir reached a peak elevation of 101.59 in the morning of 8/30/2017, then started to drop gradually to 100.91 ft at an average rate of -0.42 ft/day. It is evident that during this period, upper Buffalo Bayou at USGS gage 08072300 was still impacted by backwater from the reservoir. As shown in Figure 3-7, during the maximum release period, stage elevations at USGS gage 080732350 were very close to the reservoir pool elevation, while stages at the upper USGS gage 080732300 were dropping much faster due to the decreased flow rate. In other words, the water surface profile between these two gages gradually developed a flatter profile during this period as a result of a high pool elevation in the reservoir (causing backwater in upper Buffalo Bayou). A uniform flow condition through upper Buffalo Bayou (with no backwater) developed after 9/15/2017 when pool elevations dropped below 93 ft, as inferred from Figure 3-7 by the parallel time-stage curves.

¹⁰ In steady state flows, backwater effect is characterized by water surface slopes flatter than bed slopes.

¹¹ Maximum release during the Event is less than the capacity of the conduits.

A similar trend can be observed upstream of Addicks Reservoir during the period of maximum gate release between 8/29/2017 15:00 and 8/30/2017 16:00, as shown in Figure 3-8. Measured stage elevations at the upper HCFCD gage at Longenbaugh Road dropped much faster than those measured at the two lower gages on Langham Creek closer to the Addicks Reservoir (USGS gages 08072760 and 08072800), which closely followed the pool elevations in the reservoir. A uniform flow condition through Langham Creek (with no backwater) developed after 9/17/2017 when pool elevations dropped below 97 ft, as inferred from Figure 3-8 by the parallel time-stage curves.

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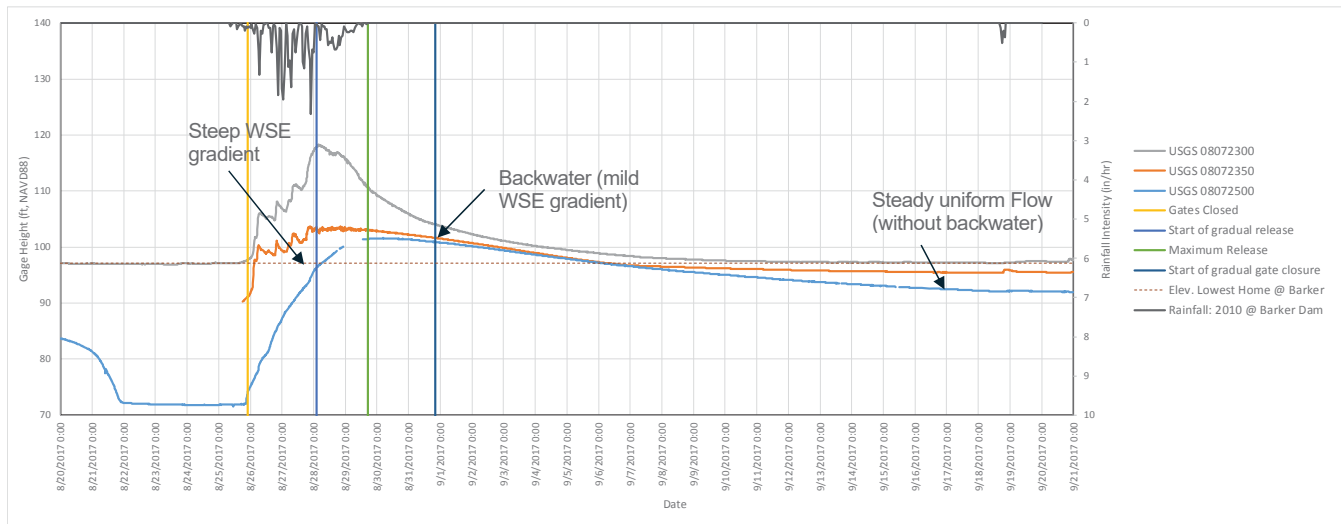


Figure 3-7: Measured water surface elevations upstream of Barker Dam at USGS gages 08072300, 08072350 and 08072500 (data retrieved from [13]. Elevation of lowest home upstream of Barker Reservoir = 97.1 [16, p. USACE016578]).

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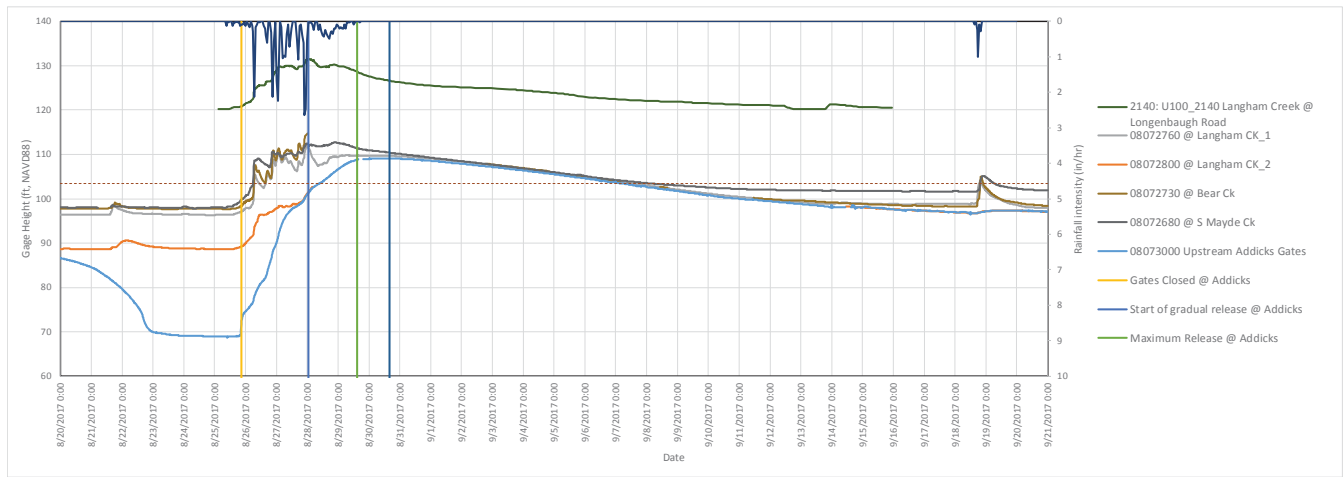


Figure 3-8: Measured water surface elevations upstream of Addicks Dam at USGS gages 08072760, 08072800, 08072730, 08072680 and 08073000 (data retrieved from [13]) and HCFCD gage 2140 (data retrieved from [14]. Elevation of lowest home upstream of Addicks Reservoir = 103.4 [16, p. USACE016576]).

3.3 USGS Rating Curves

The USGS maintains stage-discharge rating curves at various locations within the Focus Area. The curves provide a relationship between water surface elevation and flow discharge for a range of different elevations. These rating curves are periodically updated to account for recent discharge measurements and morphological changes. "Stage-discharge relations (ratings) are usually developed from a graphical analysis of current-meter discharge measurements (sometimes called calibrations) made over a range of stages and discharges. Measurements are made on various schedules and for different purposes. Each measurement is carefully made and undergoes quality assurance review. Frequently, measurements indicate a change in the rating, often due to a change in the streambed or riparian vegetation. Such changes are called shifts; they may indicate a short- or long-term change in the rating for the gage. In normal [usage], the measured shifts (or corrections) are applied mathematically to a defined rating. Ratings may be temporarily invalidated and unavailable due to backwater conditions caused by ice, tides, or other variable physical obstructions." [22]

The most up-to-date USGS rating curves are used throughout this study to estimate flow through streams under uniform flow conditions.

3.4 Estimate of Manning's Roughness based on Stream Gage Data

Under uniform and steady flow conditions, Manning's roughness coefficient n ($\text{m}^{-1/3} \cdot \text{s}$) for channels can be estimated based on the Manning's equation, below:

$$Q = 1.49(R^{2/3} \cdot A \cdot S^{1/2})/n$$

where Q is the discharge through the channel (cfs), A is the cross-sectional area (ft^2), R is the hydraulic radius (ft), and S is the slope of the energy grade line¹². The following sections present estimates of the ranges of Manning's n values in Buffalo Bayou and its floodplain based on gage data and stage-discharge rating curves.

3.4.1 Manning's Roughness – Channel

Estimate based on physical characteristics of the channel

During our site visit on 3/6/2018, we observed that the rectified section of the lower Buffalo Bayou channel (downstream west of Beltway 8) is generally rougher than the unrectified section (downstream east of Beltway 8). The floodplain is heavily vegetated in the rectified section and there was evidence of debris build up due to fallen trees, as shown in Figure 3-9, Figure 3-10 and Figure 3-11. The floodplain of the unrectified section is less vegetated as shown in Figure 3-12.

Cowan (1956) developed a procedure for estimating the effects of various factors to define the value of Manning's roughness coefficient n for a channel based on the following equation [23]:

$$n = (n_b + n_1 + n_2 + n_3 + n_4)m$$

where

- n_b is a base value of n for a straight, uniform, smooth channel, which can be assumed to be 0.02¹³.

¹² Under uniform flow the slopes of channel bed, free surface and energy grade line are equal.

¹³ Value provided by [23] after Chow (1959, [46]).

- n_1 is a correction value for surface irregularities. The rectified section of Buffalo Bayou can be assumed smooth with a correction value of 0.0, while a moderate degree of irregularity is assumed for the unrectified section with a correction value of 0.006 – 0.010 [23, p. 7].
- n_2 is a correction value for variations in channel cross section, which can be assumed gradual with a correction value of 0.0 [23, p. 7].
- n_3 is a correction value for the effect of obstructions. Appreciable obstructions¹⁴ are assumed for the rectified section above Beltway 8 with a correction value of 0.02 – 0.030 (refer to Figure 3-9, Figure 3-10 and Figure 3-11). Minor obstructions¹⁵ can be assumed below Beltway 8 with a correction value of 0.005 – 0.015 [23, p. 7].
- n_4 is a value for vegetation in the channel. Within the channel, small amount of vegetation is assumed with a correction value of 0.002 – 0.010 [23, p. 7].
- m is a correction factor for meandering of the channel. An appreciable degree of meandering is assumed above Beltway 8 (based on the ratio of the stream distance (about 6.5 miles) to the straight distance (about 5.3 miles)) with a correction factor of 1.15. Below Beltway 8 a severe degree of meandering is assumed with a correction factor of 1.3 (based on the ratio of the stream distance (about 15.75 miles) to the straight distance (about 9.1 miles)).

Based on the above, the Manning's n value for the rectified and unrectified sections of Buffalo Bayou are estimated to be in the range of 0.05 – 0.07 and 0.04 – 0.07 $m^{-1/3}$.s, respectively.



Figure 3-9: Debris build up in lower Buffalo Bayou upstream of the confluence with lower Langham Creek.

¹⁴ Appreciable obstructions occupy 15 – 50 percent of the channel's cross section [23, p. 7].

¹⁵ Minor obstructions occupy less than 15 percent of the channel's cross section [23, p. 7].



Figure 3-10: Lower Langham Creek near the confluence with lower Buffalo Bayou. The channel bank separating the channel and the inner edge of the floodplain is distinctively defined by the edge of the grass. The photo shows a heavily vegetated floodplain and a less vegetated channel.



Figure 3-11: Lower Buffalo Bayou (rectified section) near Beltway 8 showing a heavily vegetated floodplain.



Figure 3-12: Lower Buffalo Bayou (unrectified section) near Briar Forest Drive showing a less vegetated floodplain.

Estimate based on other studies

A FEMA flood insurance study for Harris County includes ranges of Manning's n values, where n for the Buffalo Bayou channel is in the range of $0.02 - 0.06 \text{ m}^{-1/3} \cdot \text{s}$ [6, p. FEMA000249].

Table 3.2 presents values of Manning's roughness coefficients adopted by the Harris County HEC-RAS model [11], which shows that Manning's n for lower Buffalo Bayou ranges between 0.04 at Beltway 8 to 0.08 at Highway 6 (downstream of the Barker Reservoir gates).

Table 3.2: Manning's roughness coefficients adopted by the HCFCD HEC-RAS model [11].

Location	Channel Manning Roughness	Floodplain Manning Roughness
Highway 6	0.08	0.15 – 0.18
Dairy Ashford Rd	0.04	0.10 – 0.20
Beltway 8	0.04	0.15 – 0.20
Piney Point	0.06	0.20
Shepherd Drive	0.045	0.20
Langham Creek	0.035 – 0.04	0.10 – 0.20
Bear Creek	0.015 – 0.06	0.10 – 0.20
South Mayde Creek	0.04 – 0.055	0.10 – 0.20

Estimate based on gage data

As noted above, Manning's equation for flow applies to uniform and steady flow conditions, and therefore, under those conditions can be used to determine Manning's n with knowledge of the other flow variables of the equation. Gage data between Beltway 8 and Piney Point was reviewed for the period from Aug 13 to Aug 19, 2017 when flow was nearly uniform as characterized by very similar slopes for the water surface profile and channel bed. The Manning's roughness coefficient for the Buffalo Bayou channel was estimated for this period as shown in Table 3.3.

Table 3.3: Estimate of Manning's n based on Uniform Flow Calculations - Channel

Location	Measurement Date	Measured Stage & Q		Channel Characteristics		Average Bed Slope	Manning's n
		Stage (ft)	Discharge (cfs)	A (ft²)	R (ft)		
Reach between Dairy Ashford Road and Beltway 8						1:1630	
Dairy Ashford Road	8/15/2017 10:08	58.03	2550	738.5	8.26		
Beltway 8	8/15/2017 11:24	48.99	2510	643.4	6.53		
Calculated reach-average Manning's n representing rectified channel section (m ^{-1/3} .s)							0.038
Reach between Beltway 8 and Piney Point						1:2440	
Beltway 8	8/15/2017 11:24	48.99	2510	643.4	6.53		
Piney Point	8/16/2017 10:00	40.02	2570	867.2	7.02		
Calculated reach-average Manning's n representing unrectified channel section (m ^{-1/3} .s)							0.032
Beltway 8	1/26/2017 10:59	49.38	2460	677.8	6.88		
Piney Point	1/26/2017 12:06	40.28	2710	898.4	6.97		
Calculated reach-average Manning's n representing unrectified channel section (m ^{-1/3} .s)							0.033

3.4.2 Manning's Roughness – Floodplain

Estimate based on physical characteristics of the floodplain

Cowan (1956) developed a procedure for estimating the effects of various factors to define the value of Manning's roughness coefficient n for a channel. A modified procedure for floodplains is described in [23] as follows:

$$n = (n_b + n_1 + n_3 + n_4)$$

where

- n_b is a base value of n for the floodplain's natural bare soil surface, which can be between 0.025 and 0.032 for firm soil¹⁶.

¹⁶ Range provided by [23] after Benson and Dalrymple (1967).

- n_1 is a correction value for surface irregularities. The Buffalo Bayou floodplain within the focus area can be considered as slightly irregular in shape with a value of n_1 ranging between 0.001 – 0.005 [23, p. 9].
- n_3 is a correction value for effect of obstructions. During the Harvey Event, homes and buildings close to the floodplain were flooded. As such, those flooded properties were occupying part of the channel causing appreciable obstructions to the flow. Under these circumstances, n_3 value could range between 0.005 – 0.030 [23, p. 9].
- n_4 is a value for vegetation in the floodplain. During the Harvey Event, water surface elevations were as high as the upper branches of the trees within the floodplain of lower Buffalo Bayou. Therefore, the flow obstruction areas associated with tree canopies are much larger than those of tree trunks at lower elevations. A roughness value for an extreme amount of vegetation is in the range of 0.100 – 0.200 [23, p. 9].

Based on the above, the Manning's n for the floodplain of lower Buffalo Bayou within the focus area is estimated to be in the range of 0.131 – 0.277 $\text{m}^{-1/3}.\text{s}$.

Estimate based on other studies

A FEMA flood insurance study for Harris County includes ranges of Manning's n values and the Buffalo Bayou floodplain's n is in the range of 0.04 – 0.2 $\text{m}^{-1/3}.\text{s}$ [6, p. FEMA000249].

Table 3.2 presents values of Manning's roughness coefficients adopted by the Harris County HEC-RAS model [11], which shows that Manning's n for floodplains within the Focus Area is generally in the range from 0.1 to 0.2.

Estimate based on stage-discharge rating curve during the Harvey Event

During the Harvey Event, USGS measured stage elevations and discharges along Buffalo Bayou and calculated the necessary shifts to their rating curves. Under steady-uniform flow conditions, Manning's n can be calculated as described in Section 3.4.1. Downstream of the dams the USGS rating curves extend to elevations covering the floodplain allowing this method to be used to calculate the floodplain roughness¹⁷.

During the Harvey Event, flow downstream of the dams was not restricted to the undeveloped floodplain, but rather flow through urbanized areas was experienced. Beretta et al. [24] demonstrated that enhanced friction can be effectively used to model flow over urbanized areas instead of representing detailed building geometry.

The USGS rating curves at Dairy Ashford Road and Piney Point were used to estimate Manning's n for the floodplains of lower Buffalo Bayou. Table 3.4 shows that Manning's n for the floodplains could be up to 0.24 $\text{m}^{-1/3}.\text{s}$. between the edge of the channel and the highest elevation of the rating curve.

¹⁷ Upstream of the dams, steady-uniform flow conditions over floodplains are unlikely as floodplain inundation is mostly driven by backwater caused by high pool elevations in Addicks and Barker Reservoirs. Therefore, this method cannot be used to calculate floodplain roughness upstream of the dams.

Table 3.4: Estimate of Floodplain roughness based on Uniform Flow Calculations

Location	Elevation (ft, NAVD88)	Q (cfs) [22]	A* (ft ²)	P* (ft)	Full Cross-sectional area averaged n (m ^{-1/3} .s.)	Floodplain only n (m ^{-1/3} .s.)
Dairy Ashford	58 (channel)	2823.16	776	128	0.04 (channel)	0.04 (channel)
	76 (floodplain)	12316.29	15694	2259	0.18 (entire section)	0.22 (floodplain)
Piney Point	36 (channel)	1851.54	491	137	0.02 (channel)	0.02 (channel)
	60 (floodplain)	13784.04	14907	1000	0.20 (entire section)	0.24 (floodplain)

* Flow area (A) and wetted perimeter (P) are calculated based on extracted cross sections.

3.5 Reservoir Rating Curves

Stage-capacity rating curves for Addicks and Barker Reservoirs are shown in Figure 3-13 and Figure 3-14, respectively. At relatively high pool elevations in the Addicks and Barker Reservoirs, small increments in pool elevations equate to significant additional amounts of floodwater stored in the reservoirs. During the Harvey Event, peak elevations in Addicks and Barker Reservoirs reached 109.09 ft and 101.59 [13], respectively, corresponding to a total stored volume of floodwater of at least 127 billion US gallons (390,000 acre-feet) without accounting for floodwater stored in detention ponds and upper tributaries. Without these reservoirs, this amount of floodwater would have been routed to areas downstream causing devastating flooding.

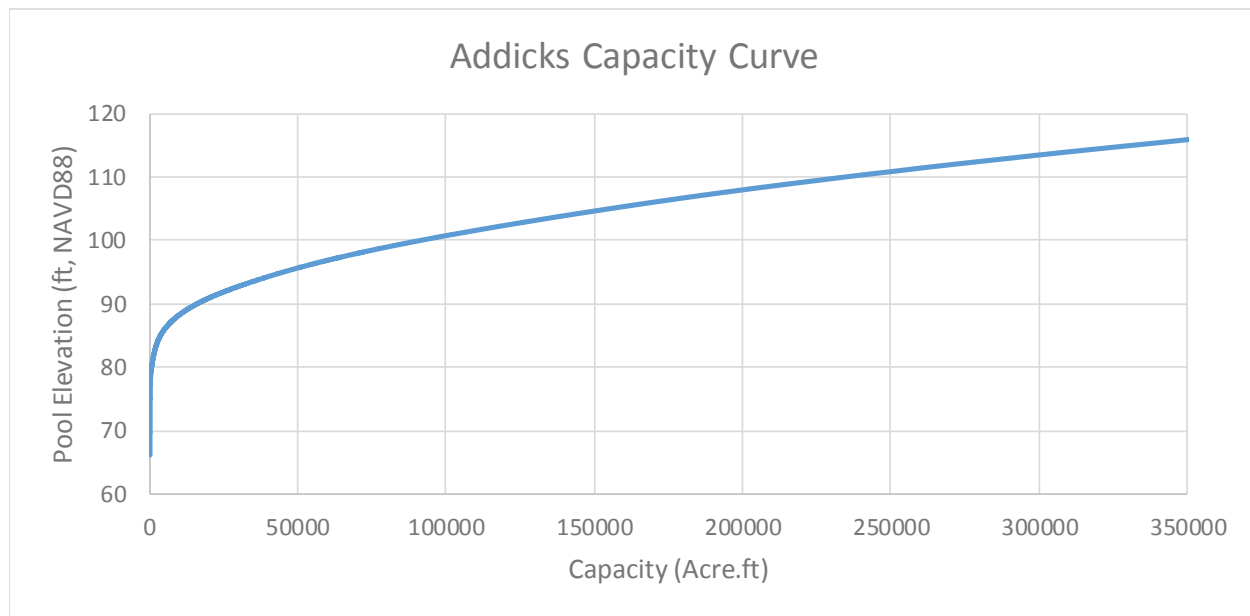


Figure 3-13: The Addicks stage-capacity rating curve (Source: 2012 Water Control Manual [7, p. USACE020232 to 020256])

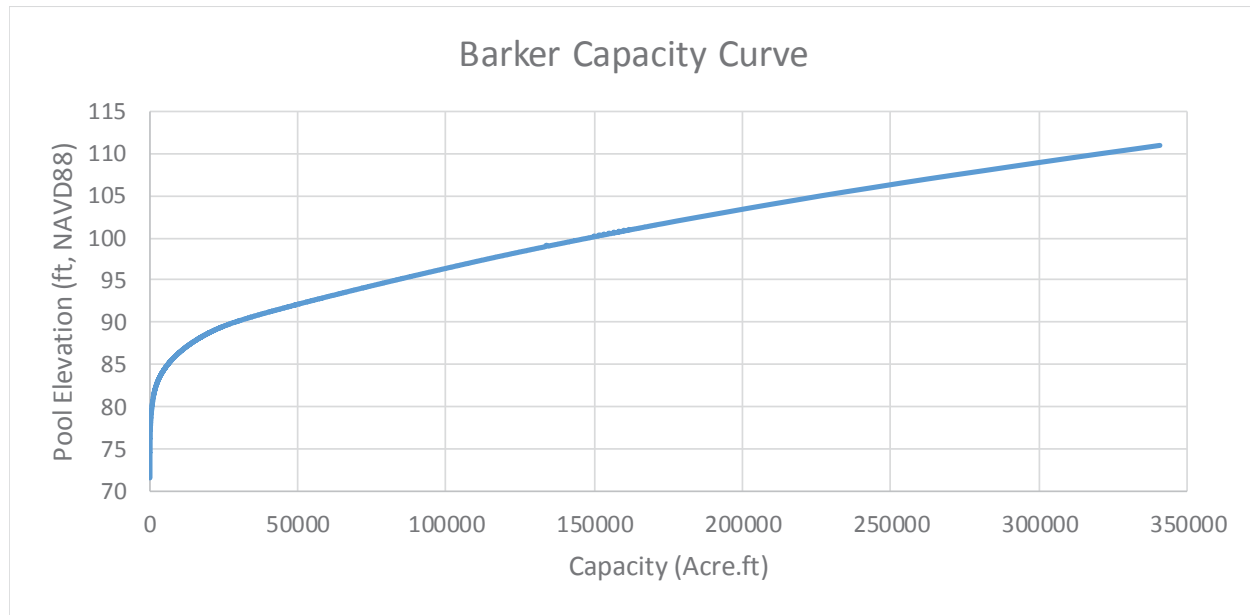


Figure 3-14: The Barker stage-capacity rating curve (Source: 2012 Water Control Manual [7, p. USACE020257 to 020276])

3.6 Inundation Mapping

Maps showing observed high water marks (shoreline) based on the NOAA mosaic aerial photos dated 8/30/2018 are shown in Figure 3-15, Figure 3-16 and Figure 3-17 for areas downstream and upstream of the Addicks and Barker Reservoirs. These aerial photos were acquired between 17:13 and 18:19 on 8/30/2018. The observed inundation limits on that day within the Focus Area were recorded as discrete lines. A continuous "shoreline" representing the observed inundation limit was developed by selecting elevation contours that matched those observed limits. Because maps presented in Figure 3-15, Figure 3-16 and Figure 3-17 represent observed inundation limits on a specific date (8/30/2017), they may not represent the maximum inundation limits during the Harvey Event.

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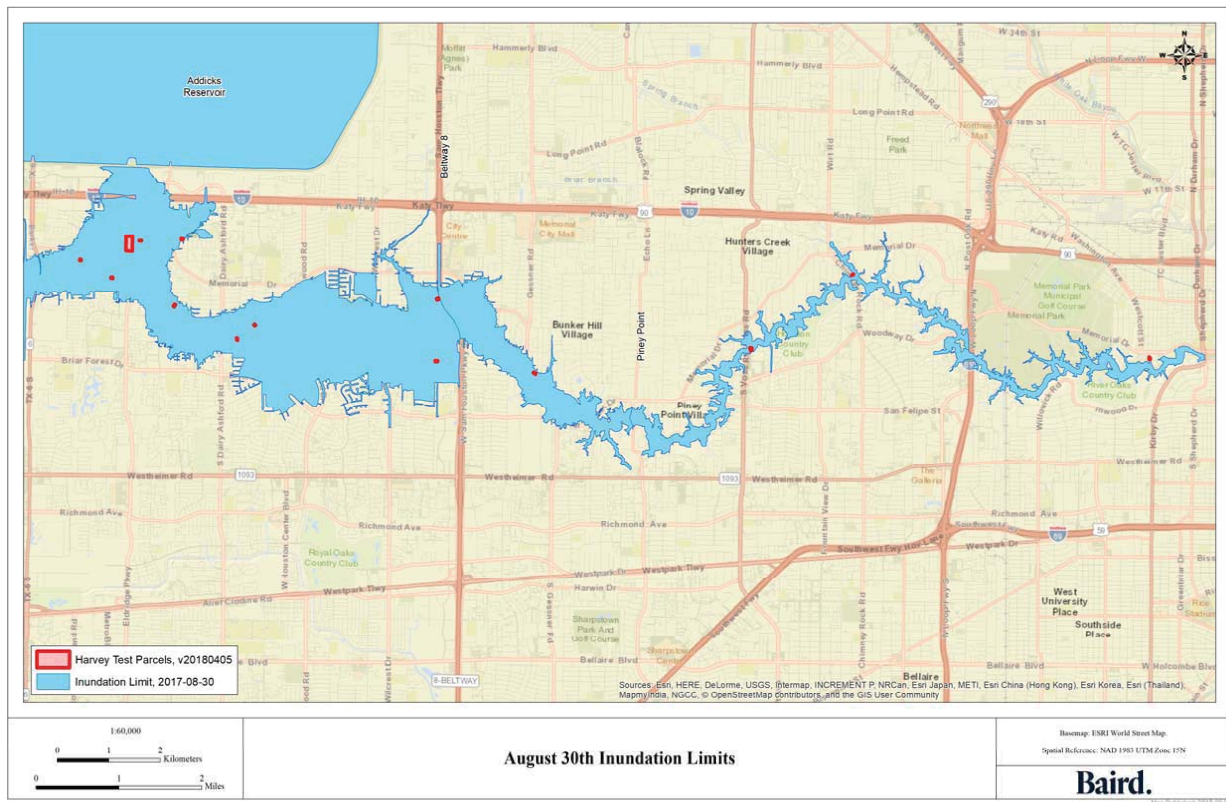


Figure 3-15: Tracked high water mark below Addicks and Barker Dams based on NOAA mosaic aerial photo dated 8/30/2018 (taken between 17:13 and 18:19)

Addicks and Barker Flood Control Reservoirs - Upstream Hydraulic Study
Expert Report of Dr. R. Naim (Upstream)

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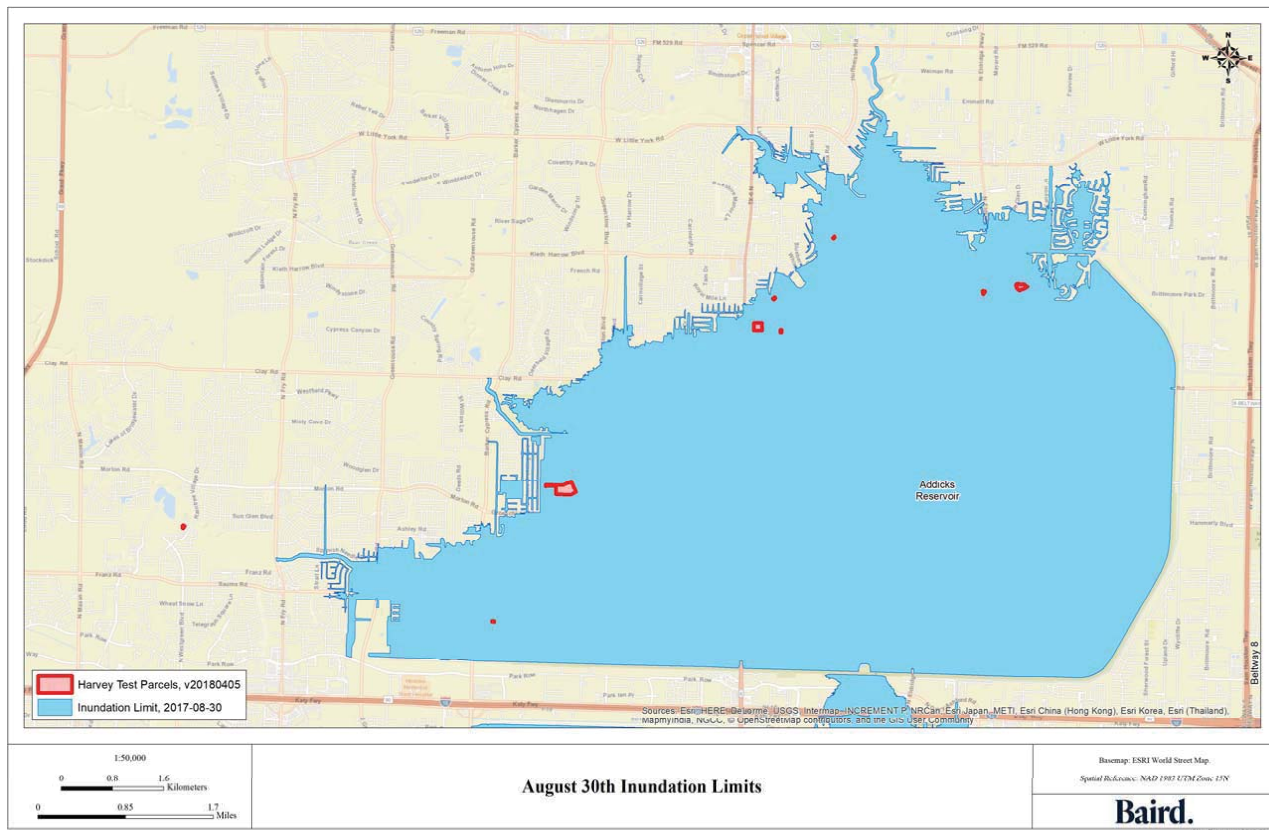


Figure 3-16: Tracked high water mark upstream of Addicks reservoir based on NOAA mosaic aerial photo dated 8/30/2018 (taken between 17:13 and 18:19)

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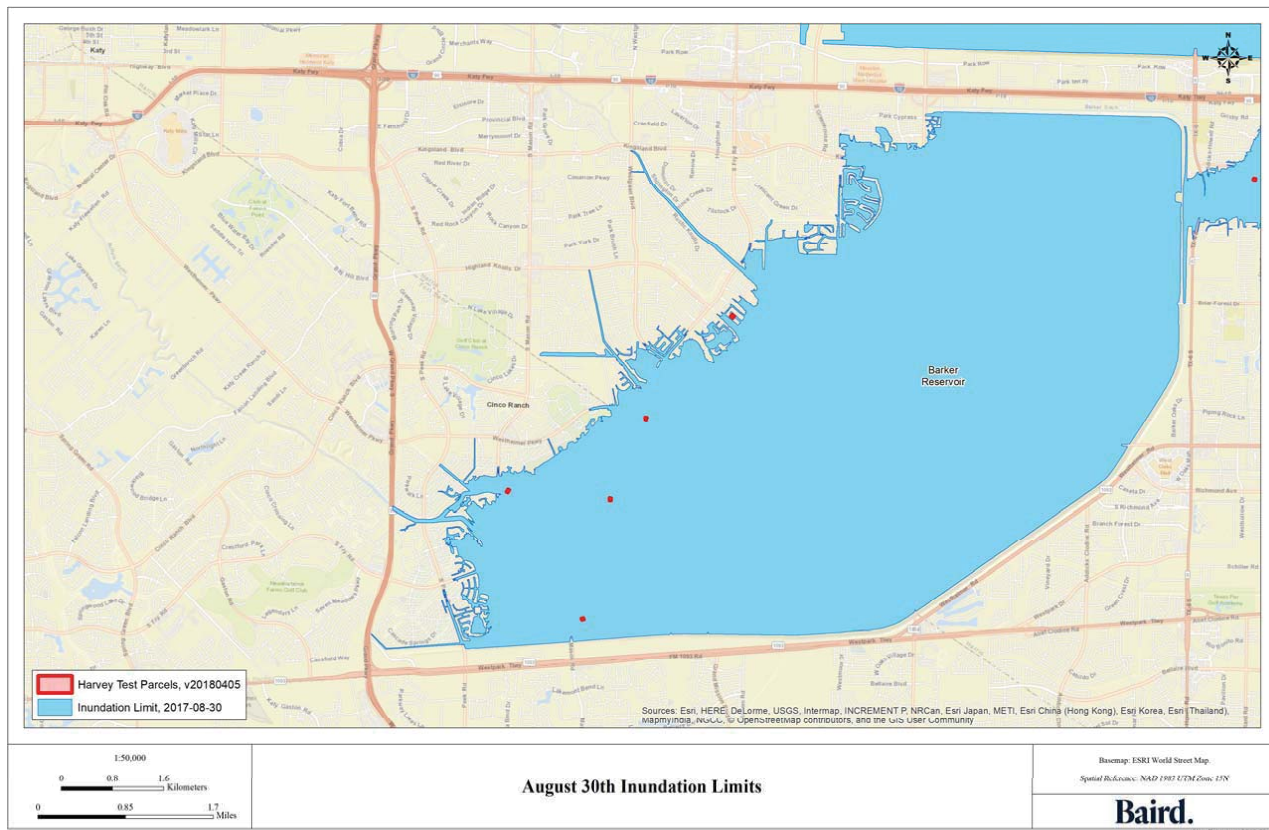


Figure 3-17: Tracked high water mark upstream of Barker reservoir based on NOAA mosaic aerial photo dated 8/30/2018 (taken between 17:13 and 18:19)

Addicks and Barker Flood Control Reservoirs - Upstream Hydraulic Study
Expert Report of Dr. R. Naim (Upstream)

Baird.

3.7 Impact of Storm Water Drains

Storm water drains may influence flood characteristics (and particularly the timing of flooding) of houses in low-lying areas behind levees or any other type of barriers, where finished floor elevations are lower than free water surface elevations in the receiving streams at the outlet of the drains. Areas between these houses and the levees/barriers may be flooded due to backwater flow through storm water drains. In this case, storm water drainage network and ponded areas behind levees/barriers act as storage for water, as rising water levels would back up flows into the storm drainage network (when water surface elevation exceeds the elevation of the upstream end of the storm drain).

Downstream of the dams, this additional storage may not be significant as the network had already been surcharged due to excessive runoff from rainfall prior to the release from the reservoirs. Under this flow regime, low-lying areas are expected to be initially flooded generating flows through storm drains towards the receiving streams. During the Harvey Event, water surface elevations downstream of the dams rose rapidly in lower Buffalo Bayou and surrounding low-lying areas surcharging the storm drainage network. During the Harvey Event and within the Focus Area, there was no temporal or spatial lag between rainfall peaks and stage elevation peaks below of the dams. This indicates that the storm water drainage network was surcharged during the Harvey Event. Therefore, backwater flows through storm drains and storage of the storm drainage network can be neglected for the area downstream of the dams.

Upstream of the dams, rising pool elevations causing backwater flow through the upper tributaries may surcharge and backwater the storm drainage system causing ponding in low-lying areas. As discussed further below, our modeling does not examine the possible impacts of overcharged storm drainage systems.

3.8 Groundwater Flow

The flow rate through soil (subsurface or seepage flow) is dependent on Darcy's permeability (or hydraulic conductivity) k [LT^{-1}] and the hydraulic gradient i [-], which is defined by Darcy's law as follows:

$$v = k \cdot i$$

The largest hydraulic gradient within the model domain is across the Addicks and Barker dams around the gates section (i.e. the lowest point on the downstream side of the embankments). Water stored behind the dams during the Harvey Event could have created a maximum head difference of 28.2 ft and 21.8 ft¹⁸ between the upstream and downstream sides of Addicks and Barker embankments, respectively. At these maximum head differences, hydraulic gradients as high as 1:6.2 and 1:11.3¹⁹ could have been generated across the Addicks and Barker embankments, respectively. Assuming a very high hydraulic conductivity of $k = 7.3 \times 10^{-3}$ m/s, the maximum seepage flow rate across the dams is estimated to be 3.9e-3 fps, which could contribute to a maximum seepage flow rate of the order of 7 cfs²⁰. This potentially maximum subsurface flow rate is several orders of magnitude less than the rates of release from either Addicks or Barker Reservoirs and surface runoff rates from local rainfall, which are on the order of thousands of cfs. Therefore, groundwater flows can be neglected.

¹⁸ Based on maximum differences between gage heights upstream and downstream of the embankments [13].

¹⁹ Assuming a linear hydraulic gradient across embankments (top of embankment width = 15 ft, side slopes = 1:3 [48, p. USACE020444], [49, p. USACE067106])

²⁰ Assuming flow area of 60 (width of Addicks outlet [48, p. USACE020445]) by 30 (water depth in Addicks outlet at maximum head difference between upstream and downstream [13] and [48, p. USACE020445]) ft².

3.9 Release from the Reservoirs

During the Harvey Event, releases from Addicks and Barker Reservoirs were made in accordance with the induced surcharge regulations as described in Section 2.11.4. The discharge released from the reservoirs is a function of head and tailwater elevations and gate heights. During the Harvey Event, water surface elevations downstream of Addicks and Barker Reservoirs rose above the soffit elevations of the respective conduits, a condition called “tailwater submergence”. According to the Corps records, tailwater submergence has never been experienced before the Harvey Event. A tailwater submergence condition results in the development of a “submerged hydraulic jump” downstream of the conduits, provided that the gate heights force the development of supercritical flow downstream of the conduits. The submerged hydraulic jump includes a free hydraulic jump above the channel bed and a large eddy above the free jump. Under this condition, discharges through the conduits may be reduced²¹, whereby the large eddy above the free jump contributes a negative flow at any given section. Exact estimates of flow through the channel during the Harvey Event (under tailwater submergence condition) would have required continuous direct measurements of discharges downstream of the dams as well as estimates of runoff contributions or any other source of discharge downstream of the dams (which should be deducted from the measurements) and estimates of lateral backwater flows to tributaries including flow over the channel banks (which should be added to the measurements).

During the Harvey Event, USGS completed a limited number of measurements downstream of Addicks Reservoir and downstream of Highway 6 (downstream of Barker Reservoir including flow contributions from Clodine and Barker Ditches). Runoff and other discharge contributions were not estimated along with these measurements. Therefore, USGS discrete discharge measurements can only represent approximate rates of release from Addicks and Barker Reservoirs.

The following data sources have been used to estimate approximate discharge released through the Addicks and Barker gates:

- Water surface elevations upstream and downstream of the conduits (based on USGS gages [13]);
- Gate height schedules ([19], [18]);
- Outlet rating curves from the 2012 WCM ([7, p. USACE020314] and [7, p. USACE020315]) not accounting for tailwater submergence;
- Discharge equations developed by the Corps providing approximate rates of release without tailwater submergence ([19], [18]; details are provided in Appendix A); and
- Discharge equations developed by the Corps providing approximate rates of release including tailwater submergence (provided by the Corps [25], [26]; details are provided in Appendix A).

Figure 3-18 shows estimated releases from Addicks Reservoir using various sources. Estimated discharges using the outlet rating curve from the 2012 WCM ([7, p. USACE020314]) and discharge equations without tailwater submergence [19] are almost identical; however they don't account for tailwater submergence. Estimated releases using the discharge equations including tailwater submergence ([25] and [26]) are about 15% less than estimates without tailwater submergence. The USGS discharge measurements downstream of Addicks Reservoir in the upper part of Lower Langham Creek include additional discharge from local runoff. Therefore, USGS measurements downstream of Addicks Reservoirs are expected to be greater than the actual approximated rates of release from the reservoir. Approximate rates of release (grey line) have been derived based on the following criteria:

- A realistic intermediate line between estimated releases with and without tailwater submergence; and

²¹ Compared to the normal conditions without tailwater submergence.

- Releases resulting in modeled water surface elevations downstream of the dams in agreement with the measured gage data (refer to Section 4.5.5).

Figure 3-19 shows estimated releases from Barker Reservoir using various sources. Estimated discharges using discharge equations including tailwater submergence are about 25% lower than those estimated without tailwater submergence. Estimated discharges using the outlet rating curve from the 2012 WCM [7, p. USACE020315] are much closer to those estimated using the discharge equations without tailwater submergence. It is believed that the lower parts of Clodine and Barker Ditches were impacted by backwater from lower Buffalo Bayou during the Harvey Event, as demonstrated in Figure 3-20. Therefore, USGS discharge measurements in lower Buffalo Bayou downstream of the confluence with these ditches would have been smaller than the actual approximated releases. By chance, the original discharge equations without tailwater submergence [18] were found to best define the approximate rate of release from Barker Reservoir, as shown in Figure 3-19 (grey line)²². Using this approach provided the best agreement between modelled and measured water surface elevations from gage data in lower Buffalo Bayou (refer to Section 4.5.5).

The first and second ramp ups of releases starting around 8/28/2017 1:00-2:00 and 8/29/2017 7:00-9:00 are evident, as shown in Figure 3-18 and Figure 3-19.

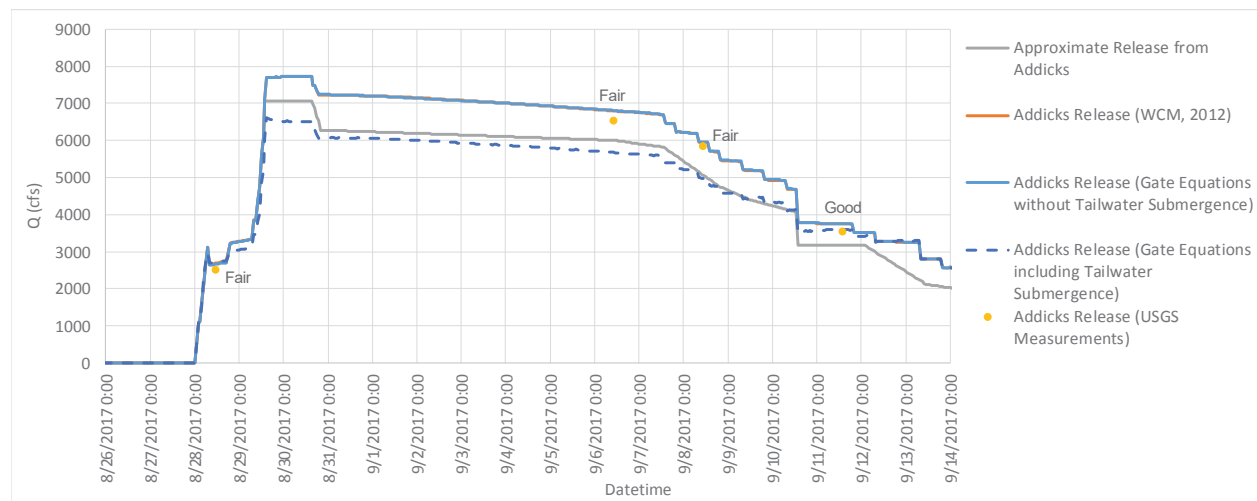


Figure 3-18: Estimated Addicks Release using various sources. The adopted best estimate of discharge for model input to lower Buffalo Bayou is the grey line. The Addicks release based on gate equations without tailwater submergence (solid blue line) is almost identical to the Addicks Release rating curves from the 2012 WCM (orange line). The dashed blue line is the estimate of release based on gate equations considering tailwater submergence. USGS measurements of discharge are shown as yellow dots (together with a good-fair-poor rating on accuracy of the measurement).

²² It would appear that for these very high flow releases the without tailwater gate equations must under-estimate the actual releases (this condition has never actually occurred in the history of the gate operation).

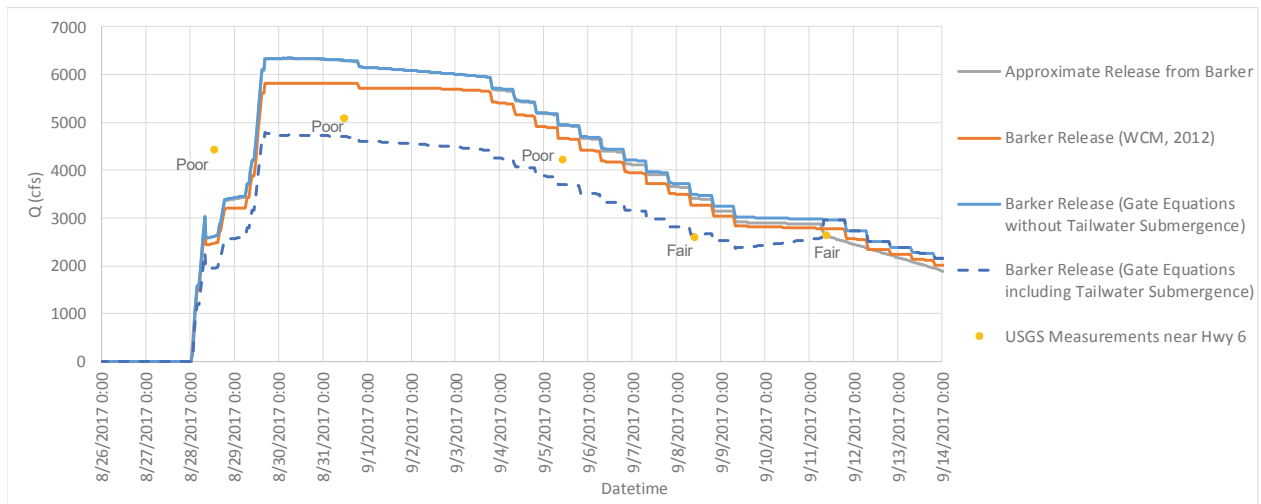


Figure 3-19: Estimated Barker Release using various sources. The adopted best estimate of discharge for model input to lower Buffalo Bayou is the grey line which mostly lies (by chance) under the solid blue line representing the release estimates derived from gate equations without tailwater submergence. The dashed blue line is the estimate of release based on gate equations considering tailwater submergence. USGS measurements of discharge are shown as yellow dots (together with a good-fair-poor rating on accuracy of the measurement).

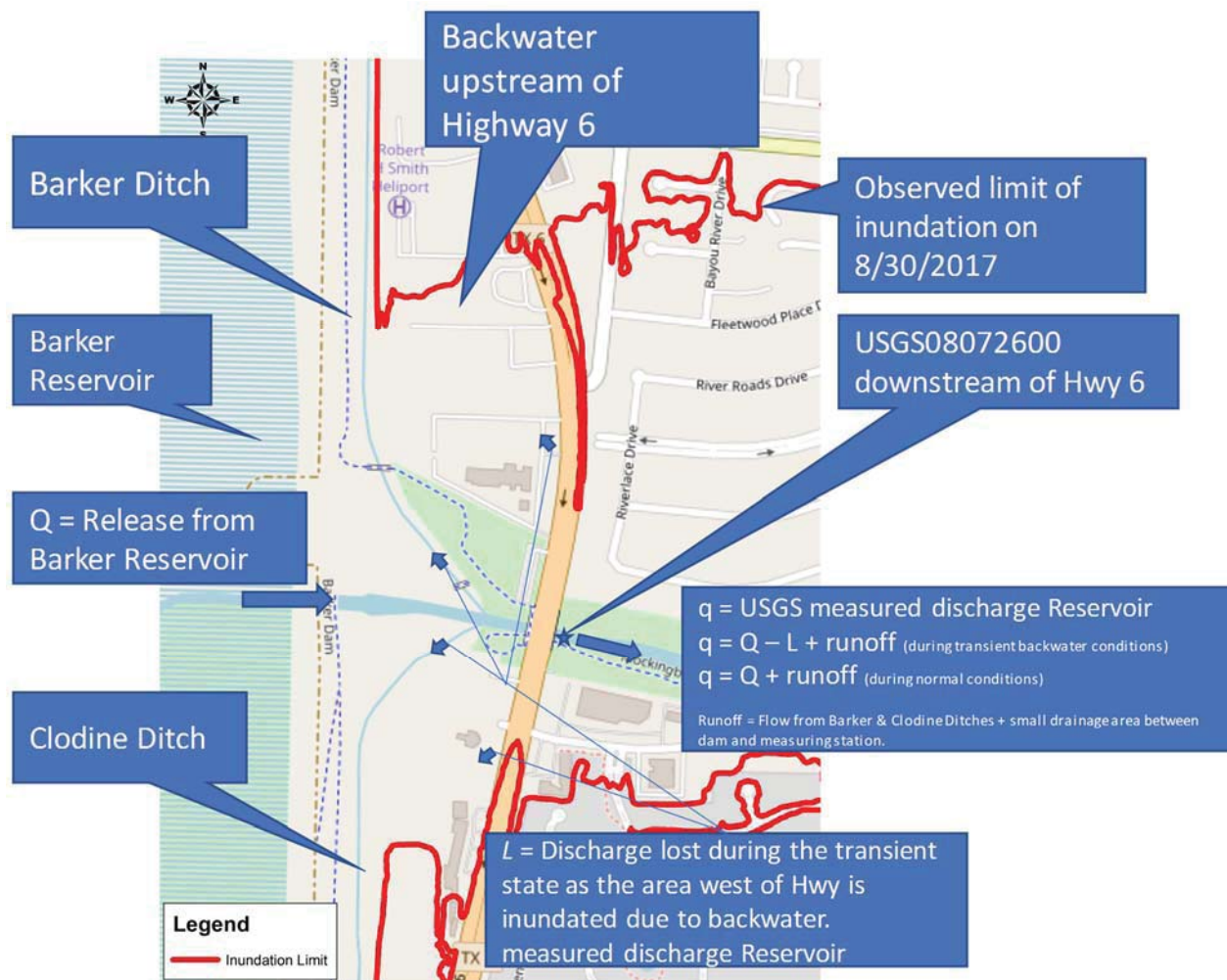


Figure 3-20: Schematic diagram showing inflows to and outflows from a control volume between Barker conduits and Highway 6. The transient backwater storage depicted in this figure explains why the measured discharges by USGS would have under-estimated the actual releases from the Barker conduits.

3.10 Characteristics of Flooding (based on physical data)

Addicks and Barker Reservoirs stored at least 127 Billion US Gallons of floodwater during the Harvey Event, which exceeded the SPF causing inundation due to backwater upstream of the reservoirs.

Storm water drains may influence the timing of flooding upstream of the dams as they may convey floodwater backward from the receiving streams towards developed areas due to rising water surface elevations in these streams (above the elevation of the upstream ends of storm drains). This backwater flow may cause ponding in low-lying areas (and additional storage) upstream of the dams as pool elevations rise rapidly.

Numerical modelling of inundation under various scenarios is required to better understand the characteristics of flooding within the Focus Area. The following sections describe the model development, calibration, validation and application.

4. Inundation Modeling

4.1 Modelling Objective

The overarching objective of the numerical modelling of inundation presented in this report was to develop a model capable of simulating inundation depth and timing with a reasonable accuracy during extreme historic and hypothetical rainfall/storm events within the Focus Area, and particularly at the Test Property locations. The model provides a tool to study the characteristics of flooding within the Focus Area by filling the gaps between available gage data and by simulating flooding under various dam operation assumptions. Further, the model provides a tool to study impacts of the federal project by simulating flooding under various physical configurations.

In order to achieve this objective, a two-dimensional distributed model capable of simulating runoff, inundation and storm surge for extreme rainfall/storm events (including Hurricane Harvey) was identified and applied.

4.2 Model Selection

There are some key characteristics of the watershed. Under major floods, many of the drainage basins within Harris County are characterized by basin overflow [6, p. FEMA000249]. The Addicks and Barker watersheds are connected to the lower Buffalo Bayou watershed through the Addicks and Barker Reservoir gates. Hurricane Harvey rainfall featured significant temporal and spatial variation over the Buffalo Bayou watershed. Also, given the extreme amount of rainfall, overland sheet flow was the dominant mode of flow. Therefore, to simulate major flood events, a two-dimensional distributed model must be employed. In addition, the model should be capable of handling large domains to represent all of the watersheds of concern. The model domain should include watersheds within Harris County and Fort Bend County, the Cypress Creek watershed, and other contributing watersheds (the Domain), and should simulate the conveyance across these watersheds (including the releases from Addicks and Barker Reservoirs).

During major flood events, soils become saturated during the early stages of the storm and storm drains become fully surcharged²³. As such, major floods can be simulated using a free surface flow model, where sub-surface flows can be ignored within the model.

Free surface flows are governed by the Navier-Stokes equations. Depth averaging (integration over the flow depth) of the Navier-Stokes equations results in the non-linear shallow water equations (NLSW), which govern the two-dimensional flow. During major floods in the Domain, runoff discharges and release from Addicks and Barker dams could lead to relatively high flow velocities. In addition, operation of the dam gates typically leads to flood waves due to the relatively rapid opening of the control gates. Therefore, a two-dimensional model based on the NLSW equations should be applied in order to simulate such flood waves.

Other spatially-confined rapidly varied flows such as hydraulic jumps that may develop below the control gates or rapid drops downstream of weirs or other obstructions are localized flow features of negligible importance considering the scale of the study and the locations of the Test Properties. These spatially-confined rapidly varied flows require extensive computational requirements to resolve, while they may only have minimal impact on inundation of the floodplain.

²³ Storm sewers are typically designed based on a 2-year return period.

During the Harvey Event, rainfall intensities across the various watersheds of interest were significantly variable both temporally and spatially. As such, the selected 2D numerical model must support temporal and spatial rainfall variability.

In summary, in order to achieve the modelling objective, the numerical model must include the following main features:

- Surface water model.
- Two-dimensional distributed (vs. lumped hydrologic) model.
- Governing equations based on depth-averaged Navier-Stokes equations (or non-linear shallow water equations, NLSW)
- Capable of handling large domains.
- Capable of including temporal and spatial rainfall variability.

Table 4.1 presents a comparison between model features of four different numerical models for free surface water flow, namely: GSSHA (model I), HEC-RAS (model II), MIKE FLOOD (model III) and TELEMAC (model IV). Due to its stability and efficient computational solver, the TELEMAC model was assessed to be capable of simulating a relatively large domain and was selected for this study. TELEMAC is an open source model widely used to simulate free surface flows in large domains.

Table 4.1: Comparison between free surface water models considered

Model Features	Models Considered				Superiority
	GSSHA (I)	HEC-RAS (II)	MIKE FLOOD (III)	TELEMAC (IV)	
Gov. Eqns.	DWA**	DWA** or NLSW*	NLSW*	NLSW*	II, III, IV
Discretization	Finite Volume	Finite Volume	Finite Volume	Finite Element or Finite Volume	N/A
Parallelized	Yes	Yes	Yes	Yes	N/A
Solver	Explicit	Explicit	Explicit	Implicit or Explicit	IV***
Grid	Cartesian	Flexible	Flexible	Flexible	II, III, IV
Stability	Conditional	Conditional	Conditional	Unconditional****	IV
Wetting/drying	Yes	Yes	Yes	Yes	N/A
Storm surge	Yes	No	Yes	Yes	I, III, IV
Rainfall Variability	Time & Space	Time only	Time & Space	Time & Space*****	II, III, IV
Auto Calibration	Available	Not available	Not Available	Not available	I

*NLSW: Non-linear shallow water equations are derived from depth-integration of the Navier–Stokes equations.

** DWA: Diffusive Wave Approx. of NLSW eqns. is derived by ignoring advective acceleration terms. Approximation does not hold for high Froude number flows such as wetting and drying during flooding and drying out.

*** Implicit solvers are preferred because they are much quicker than explicit solvers. This is needed for this study.

**** TELEMAC implicit solver is “theoretically” unconditionally stable whereby Courant Number >1 can be used.

***** Required development of spatial variability subroutine.

4.3 TELEMAC 2D Model

TELEMAC 2D was initially developed by the National Hydraulics and Environment Laboratory (Laboratoire National d’Hydraulique et Environnement - LNHE) of the Research and Development Directorate of the French Electricity Board (EDF-R&D), and is now managed by a consortium of other consultants and research institutes (more information can be found in www.opentelemac.org) [27]. Like previous versions of the program, version 7.0 complies with EDF-R&D’s Quality Assurance procedures for scientific and technical programs.

The following sections provide a description of the TELEMAC 2D model.

4.3.1 Governing Equations

4.3.1.1 Surface Water Flow

The non-linear shallow water (NLSW) equations which are also often referred to as the de Saint Venant equations govern surface flow. The NLSW equations are derived from the Navier Stokes equations under the assumption that the flow is irrotational and that the vertical acceleration is of negligible importance [28]. This equation set is valid for shallow water or long waves (the type of waves observed in rivers and due to rainfall flooding and storm surge fall into the long wave category). In vector form, with the water depth denoted by h and the depth-averaged water velocity denoted by $u = [u, v]^T$, the NLSW equations are as follows:

$$\frac{\partial h}{\partial t} + u \cdot \nabla h + h \nabla \cdot u = S_h$$

$$\frac{\partial u}{\partial t} + u \cdot \nabla u + h \nabla \cdot u = S_m$$

where S_h and S_m denote the vectors of source terms in the continuity and momentum equations, respectively. These source terms include the effects of bottom geometry, Coriolis force, bottom friction, rainfall and infiltration. Integration of the NLSW with respect to time yields the instantaneous values of water depth (and thus free surface) and depth-averaged velocity components. Integration of the equations at discrete time intervals, therefore, provides full detail of the time-evolution of the flow within the constraints of the shallow water framework.

4.3.1.2 Infiltration (Loss)

The Soil Conservation Services (SCS) Curve Number provides an empirical method to determine runoff generated by precipitation [29]. The Curve Number method uses soil type, land use, and antecedent moisture conditions to generate a single curve number ranging from 0 to 100. Higher values of curve numbers indicate areas that have higher potential for runoff in a rainfall event. The curve number is first used to determine the potential maximum soil moisture retained after runoff begins (S).

$$S = \left(\frac{1000}{CN} - 10 \right)$$

The potential maximum soil moisture is used to determine the initial abstraction (I_a), which is the amount of precipitation (P) that is intercepted (by infiltration into the soil) before runoff occurs. If precipitation depth is less than the initial abstraction, no runoff occurs.

$$I_a = 0.2 \times S$$

The initial abstraction is then incorporated into a runoff equation to determine the total runoff (Q). Both initial abstraction and runoff are provided in units of inches of runoff.

$$Q = \frac{(P - I_a)^2}{P - I_a + S}$$

4.3.2 Numerical Solution

The open source TELEMAC 2D software includes both finite element (FE) and finite volume (FVM) solution techniques for the NLSW equations. The FE-type solution has been chosen for this study since it has been implemented in a fully implicit form. Even with distributed memory parallelization, run times for explicit schemes can still be prohibitive for large domains (>1M computational nodes) because the time step

restrictions for explicit schemes are governed by the CFL²⁴ condition [30] and are, therefore, relatively stringent. The advantage of using a fully implicit solver, like the FE solution technique used in TELEMAC 2D, is the ability to employ a Courant number (Courant et al., 1967 [30]) greater than unity, and thus use a larger time-step, resulting in computationally efficient simulations..

4.3.3 Boundary Conditions

4.3.3.1 Transmissive Boundary Conditions

At open boundaries, a pseudo-Sommerfeld radiation type condition is employed. In this approach, the shallow water wave celerity c is calculated from the nearest computed water depth d at the boundary node ($c = \sqrt{g \cdot d}$). The celerity is then multiplied by the x - and y -component of the unit outward normal at the boundary edge in order to obtain the u - and v -velocity components, respectively. In order to further suppress numerical instabilities at the boundary, the values of these velocity components were limited. This approach works well as a far-field boundary condition if the boundary is far enough from the area of interest.

4.3.3.2 Galveston Bay Tidal Boundary

Tidal boundary conditions (including storm surge) driven by water levels extracted from NOAA Gage 8770613 [31] have been adopted for the Galveston Bay offshore boundary. For tidal type boundary conditions, tides are prescribed as free surface time-series as opposed to using TPXO data²⁵. The standard TELEMAC model approach for prescribing a Dirichlet condition on the water depth (read in from a time-series file based on measured WSE at NOAA gage) and free velocities (as described in Section 4.3.3.1) is adopted. Under this approach, the continuity equation is not solved since the prescribed value of the depth is forced at the boundary node, which can lead to violation of mass conservation. Therefore, the TELEMAC option to include “continuity correction” was employed to resolve this issue. This type of boundary treatment was selected due to its suitability as a far-field boundary (far enough from the area of interest).

4.3.4 Model Development

4.3.4.1 Spatially Varied Rainfall and Wind Fields

The implementation of spatially varying rainfall involves the modification of a number of TELEMAC subroutines (refer to [27]). The “TELEMAC METEO_FROM_BINARY_FILE” and the “READ_BIN_2D” subroutines were modified to enable reading of rainfall intensities over the computational grid. A few modifications to the subroutine “RUNOFF_SCS_CN” were made to enable the rainfall data to be time and space varying.

The ability to read in a time and space varying wind field is achieved in a similar fashion.

4.3.4.2 Flow through Addicks and Barker Conduits

Flow through the Addicks and Barker conduits were treated in the model as mass sources and sinks. The values of these mass sources and sinks are defined based on the outlet rating curves ([7, p. USACE020314] and [7, p. USACE020315]) accounting for discharge reduction due to tailwater submergence as discussed in Section 3.9. The model was modified to include the definition of sources and sinks either to represent total released discharges as defined by grey lines in Figure 3-18 and Figure 3-19.

²⁴ The “CFL” condition is named after R. Courant, K. Friedrichs, and H. Lewy who first described it in their 1928 paper, which was later translated and published in 1967 [30].

²⁵ “TPXO is a series of fully-global models of ocean tides, which best-fits, in a least-squares sense, the Laplace Tidal Equations and altimetry data.” [53]

4.3.5 Model Limitations

TELEMAC 2D is a surface water model that uses a computational mesh to discretize the model domain. The following outlines the model limitations as they apply to the Focus Area.

4.3.5.1 Model Type

The free surface flow model does not include sub-surface flows. Therefore, subsurface flows (such as seepage flow) cannot be simulated by the model. As demonstrated in Section 3.8, groundwater flows are found to be relatively insignificant.

4.3.5.2 Limited Number of Culverts

While culvert structures can be included in surface water models through the introduction of flow as a function of free surface elevations at both ends of each culvert structure, such treatment of culvert structures may introduce model instability and should be limited.

Typically, under normal flow conditions, a culvert conveys water across a street as a free surface flow (if water surface elevations are lower than the culvert's soffit) or as a pressurized flow (driven by head difference on either side of the street). Culverts can range from small storm water drains (order of 1-2 ft diameter) to large culverts on major streams (i.e. concrete box culverts). The flow through a culvert becomes ineffective after flooding of the street with insignificant head difference across the street. Excessive runoff flooded streets within the Focus Area during the Harvey Event within a relatively short period of time. Therefore, we determined that most of the culverts in the model domain can be omitted, except those culverts conveying water across major roads that were not flooded during the Harvey Event.

Under this type of treatment, the model is not capable of simulating drainage of low-lying areas (such as detention ponds). Simulated water surface elevations in these areas are expected to be generally higher since the model does not include any release mechanism of ponded floodwater. This may result in conservative estimates of peak water surface elevations (higher than actual) and duration of flooding (longer than actual) at Plaintiffs' homes located in low-lying areas, where floodwater could be trapped. This does not apply to Addicks and Barker Reservoirs, since their releases through the conduits are included in the model.

The model is also not capable of simulating flows through storm drains towards low-lying areas surrounded by higher ground elevations (such as banks or levees) in cases where water surface elevations in the adjacent waterbodies are higher than water surface elevations (or invert elevations of storm drains) at these low-lying areas. This condition may result in initial underestimates of peak water surface elevations at these low-lying areas prior to overtopping of the surrounding banks or levees. Ms. Burnham's Test Property is located in a low-lying area surrounded by higher ground elevations. This Test Property is located upstream of Addicks Reservoir to the south of the Langham Creek. The model is not capable of estimating early stages of flooding in this area due to the rising pool elevation in Addicks Reservoir and/or Langham Creek.

4.3.5.3 Model Topography

As discussed in Section 2.3, the model topography is based on the most recent LiDAR survey covering the entire model domain, which is dated 2008. Physical features that may have changed between 2008 and 2017 may impact model results. In addition, topography of low-lying areas and streams may not be well represented by the LiDAR survey if they were ponded at the time the LiDAR was flown²⁶. This may lead to underestimates of the volume of detention ponds or underestimated capacities of the Addicks and/or Barker Reservoirs.

²⁶ LiDAR does not penetrate below the water surface. Therefore, channel bathymetries must be provided by another survey source. Unlike streams downstream of the reservoirs, elevations derived from HEC-RAS cross sections upstream of the reservoirs are found very similar to the 2008 LiDAR.

Under-estimated reservoir and detention pond capacities upstream of the dams will generally lead to over-estimated water surface elevations at the upstream properties. Misrepresentation of the topography is not expected to impact model results below the dams, since the areas around lower Buffalo Bayou were fully urbanized by 2008.

The LiDAR survey included in the model represents the bare-earth topography. As such, basements (where the First Floor Elevation is lower than the ground elevation) are not represented by the model. Therefore, flooding and drainage of basements through local drains are not captured by the model. In cases where Finished Floor Elevations at Plaintiffs' homes are lower than ground elevations (rare cases), early flooding that may take place before flooding of the adjacent ground will not be simulated by the model. In reality, this early flooding could only occur through local drains or seepage flow providing subsurface entry for water to basements, which is less significant than flooding due to surface flow and is not captured by the model anyway (refer to Section 4.3.5.2).

The bare-earth topography does not include superstructures (such as buildings above grade and bridges). These superstructures may account for flow constrictions, which cannot be captured by the model. This may be significant in highly developed areas near flow paths. However, enhanced roughness of the floodplain was calibrated to account for additional roughness due to superstructures (as demonstrated by Beretta et al. [24]).

4.3.5.4 Computational Mesh

The model computational mesh reasonably represents streets and streams within the Focus Area (refer to Section 4.4.2). Outside the Focus Area, important physical features could be missed. These features may include detention ponds or other low-lying areas above Addicks and Barker Reservoirs, which may act as additional storage areas above Addicks and Barker. Misrepresentation of such low-lying areas may lead to over-estimated water surface elevations at the upstream properties.

4.3.5.5 Rapidly-Variied Flows

Spatially-confined rapidly varied flows (such as hydraulic jumps and rapid drops in water surface elevations) are not simulated due to escalating computational cost. These types of rapidly varied flows are insignificant compared to the scale of the study.

A minimum mesh element size must be reasonably selected to represent physical features such as street networks and channel cross sections. Such minimum element size, of the order of 10 – 15 ft, is not sufficiently small to resolve rapidly varied flow generating sudden water surface elevation changes (such as hydraulic jumps or elevation drops due to weirs or channel obstructions). Unlike the flood waves originated by the gate control, these types of "spatially-contained" rapidly varied flows may have minimal impact on inundation depths outside main channels and there are no Test Plaintiffs located in these areas anyway. In order to simulate such insignificant rapidly varied flows, elements sizes must be reduced to less than a foot, which significantly increases the computational cost.

4.4 TELEMAC 2D Model Setup

4.4.1 Model Domain

The model domain covers an area of 1,173,751 acres including sub-basins within the Focus Area and other sub-basins that may overflow to impact the Focus Area (such as the Cypress Creek sub-basins). The model domain extends into Galveston Bay to account for storm surges and to act as an open boundary. The model domain is shown in Figure 4-3 along with HUC-8 watershed boundaries.

4.4.2 Mesh Generation

The model flexible mesh was generated to meet the following requirements:

- Mesh lines representing streets within the Focus Area in order to simulate sheet flow in streets during flood conditions
- Mesh lines representing channel beds and banks, gullies and tributaries within the Focus Area in order to correctly route flows through channels and low-lying areas
- Mesh lines representing dikes, bumps and other distinctive topographic features in order to simulate flow or water storage behind these features
- Mesh nodes at both ends of major hydraulic structures for treatment of flow boundaries
- Mesh nodes with sufficient resolution to represent flooded subdivisions, including Test Plaintiffs' homes

The finite element mesh for the TELEMAC-2D model was generated using Blue Kenue™ software, developed by National Research Council Canada [32] and R [33]. Channels were represented by elements elongated in the direction of flow, with at least 3 elements across the channel. Elements were forced to represent topographic features within the floodplain (such as a bike trail). The total number of mesh nodes representing the physical conditions prior to the Harvey Event is 1,447,889 forming 2,902,890 triangular elements. Other computational meshes were generated using similar resolution and approach to represent conditions for other model runs.

4.4.3 Physical Parameters

4.4.3.1 Rainfall

As noted earlier in Section 2.9, we acquired rainfall data for the Harvey Event across the model domain from the Harris County flood warning system website [14]. In addition, we utilized the outcome of the Storm Precipitation Analysis System describing rainfall as 60-minute rainfall data gridded at a spatial resolution of 0.01 seconds of latitude/longitude (approximately 1 km² resolution) [15]. Figure 4-1 shows the total accumulated rainfall depths during the Harvey Event across the model domain.

4.4.3.2 Model Topography

As noted in Sections 2.3 and 2.4, various sources have been used to develop the model topography, which are summarized as follows:

- 2008 LiDAR [9, pp. BAIRD0000294-345] was used to represent the topography of the entire model domain;
- NOAA Galveston Coastal DEM was used to represent the bathymetry of Galveston Bay [34];
- 2014 LiDAR [10] was used to update the topography in areas of Fort Bend County (including tributaries draining to Barker Reservoir);
- HEC-RAS cross sections [11] were used to update channels sections as applicable; and
- 2018 LiDAR [12] was used to update the Lower Langham Creek cross section (at the Addicks outlet).

Figure 4-2 presents the various sources used to develop TELEMAC-2D model topography.

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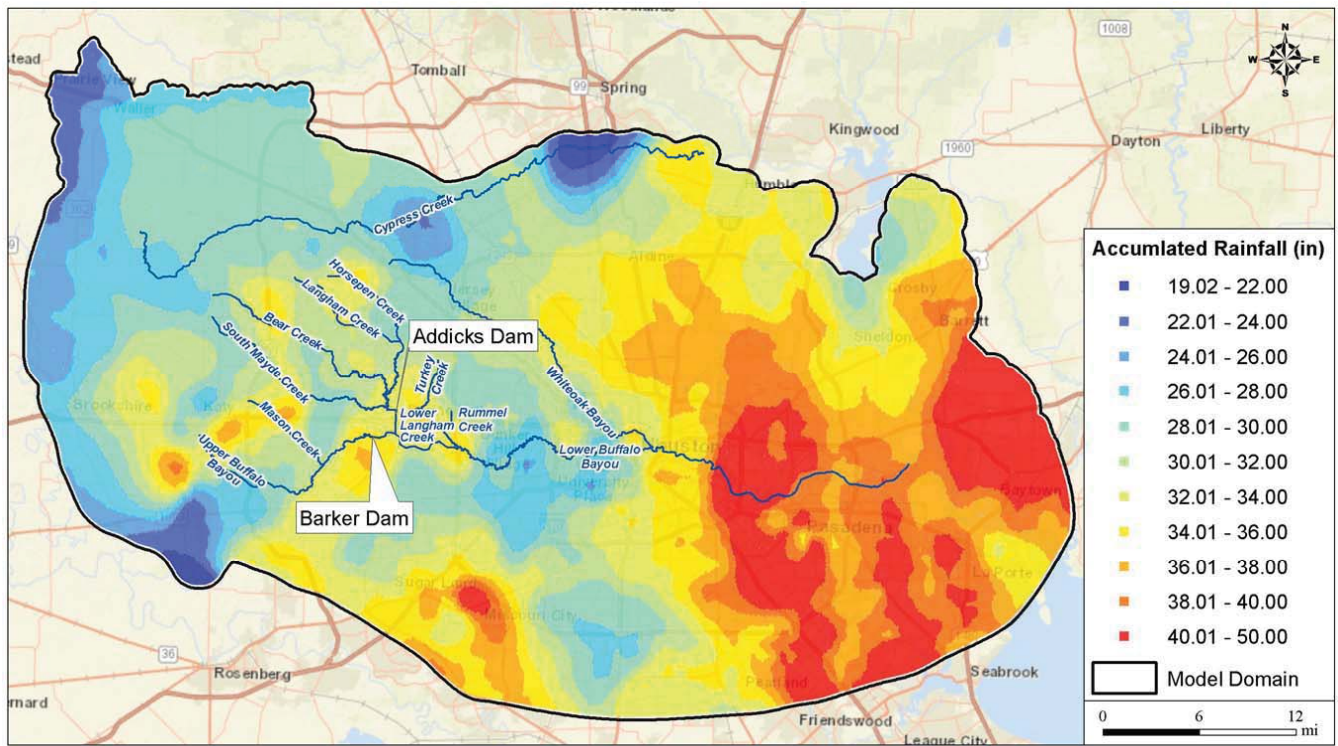


Figure 4-1: Total accumulated rainfall depth during the Harvey Event across the model domain.

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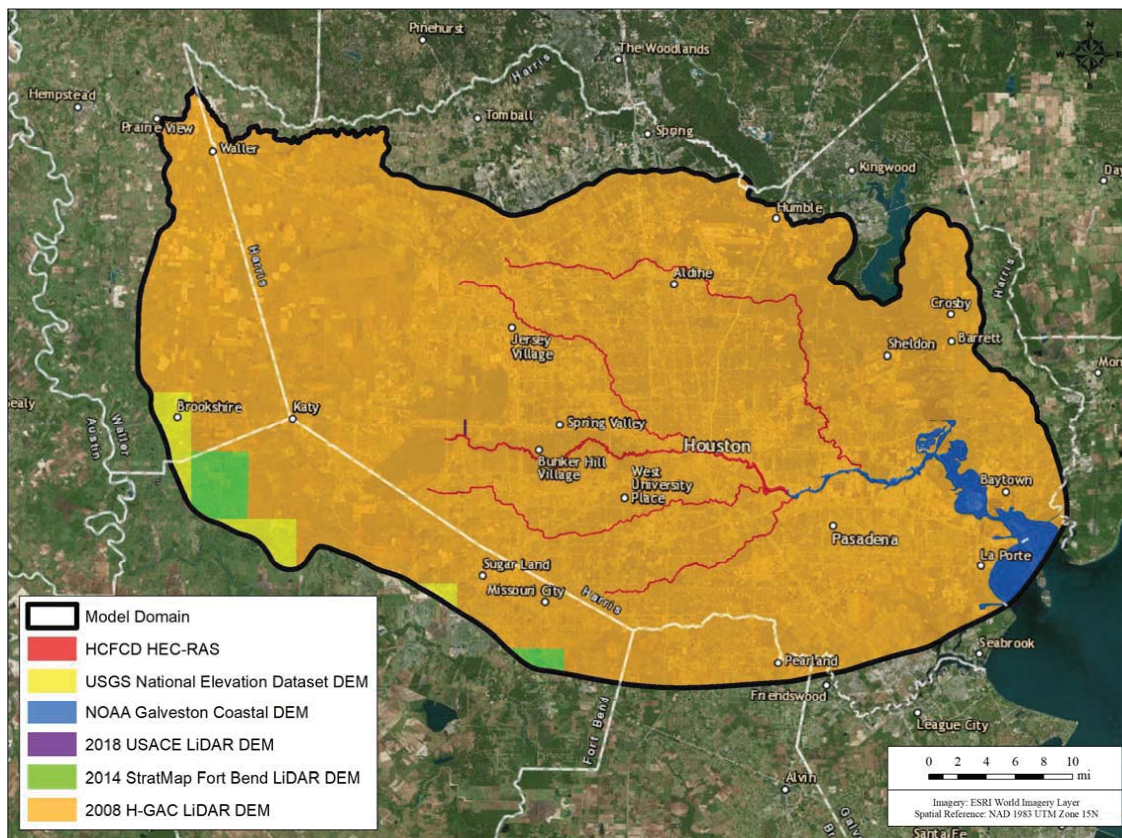


Figure 4-2: Sources of model topography.

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4.4.3.3 Hydrologic Losses

As noted earlier, hydrologic losses (due to infiltration, interception and other factors) were estimated using the Curve Number method. Datasets include the eight-digit hydrologic unit code (HUC-8) watersheds from USDA–NRCS, land use data from the 2011 National Land Cover Database (NLCD 2011 [35]) from a collaboration of governmental agencies, and the SSURGO hydrologic soil group from USDA–NRCS. Datasets were downloaded using the National Geospatial Data Gateway available from the United States Department of Agriculture National Resource Conservation Service (USDA–NRCS) [36].

Once data were downloaded and consolidated, they were incorporated into GIS software. The HUC-8 watersheds within the model domain are shown in Figure 4-3. Land cover data within the HUC-8 watersheds overlapping the model domain were summarized into various classifications with each classification representing a unique land use category, as shown in Figure 4-4. The relevant soil data within the HUC-8 watersheds were summarized into four hydrologic soil groups (HSGs), which are shown in Figure 4-5 [37]. The HSGs are classified from A to D, with A indicating soils with high permeability and D indicating soils with low permeability.

To calculate curve numbers, the land use categories and the hydrologic soils groups were consolidated across the model domain to calculate the curve number for each combination of values. Table 4.2 shows the curve number for the different land uses and soil groups. In addition to land use type and soil type, curve number also depends on the moisture content of the soil before the storm event. Antecedent soil moisture condition (AMC)²⁷ represents the amount of water in the soil. AMC is categorized into three conditions: AMC I, AMC II, and AMC III. Curve numbers provided in Table 4.2 are representative of AMC II. AMC, although informed by available information on soil moisture, ultimately becomes a model calibration parameter within the range of reasonable values. We address this further in Section 4.5.

Curve number maps representing existing conditions were prepared by intersecting the following three GIS layers within the model domain:

- Hydrologic Soil Group (Figure 4-5);
- Antecedent Moisture Conditions map, in accordance with the calibrated model assuming AMC representative of conditions prior to the Harvey Event; and
- Land use map provided by NLCD [38].

Table 4.2: Curve number (AMC II) by land use and soil type

Cover Type	Hydrologic Soil Group			
	A	B	C	D
Water	100	100	100	100
Open Space (Good)	39	61	74	80
Residential - 1/2 acre	54	70	80	85
Residential - 1/8 acre	77	85	90	92
Commercial & Business	89	92	94	95

²⁷ Also defined by [54, pp. 10–5] as Antecedent Runoff Condition (ARC), which collectively accounts for the variability in runoff predictions due to factors including rainfall intensity and duration, total rainfall, soil moisture conditions, cover density, stage of growth, and temperature.

Fallow - Bare Soil	77	86	91	94
Oak-Aspen (Good)	30	30	41	48
Woods (Good)	30	55	70	77
Woods (Fair)	36	60	73	79
Brush (Fair)	35	56	70	77
Pasture, Grassland (Fair)	49	69	79	84
Meadow	30	58	71	78
Row Crops - SR (Good)	67	78	85	89
Woody Wetlands	100	100	100	100
Emergent Herbaceous Wetlands	100	100	100	100

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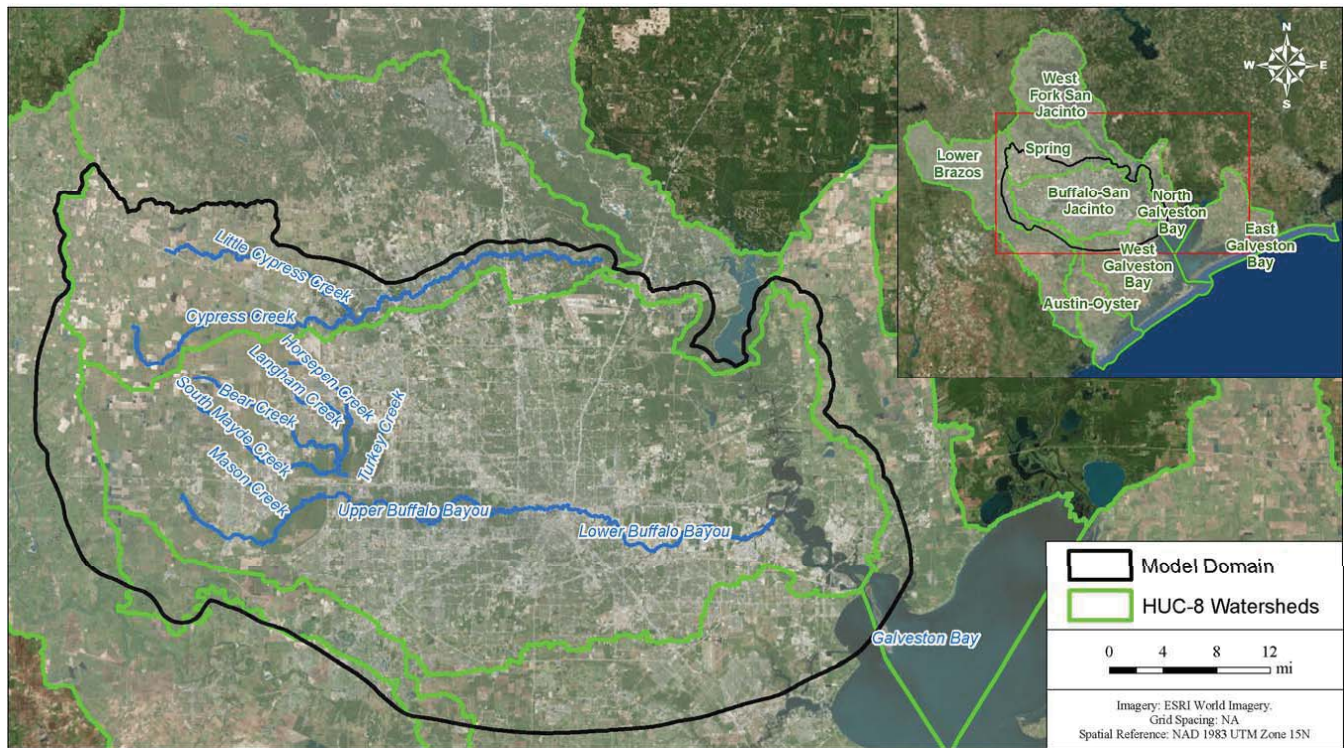


Figure 4-3: HUC-8 watersheds within the model domain

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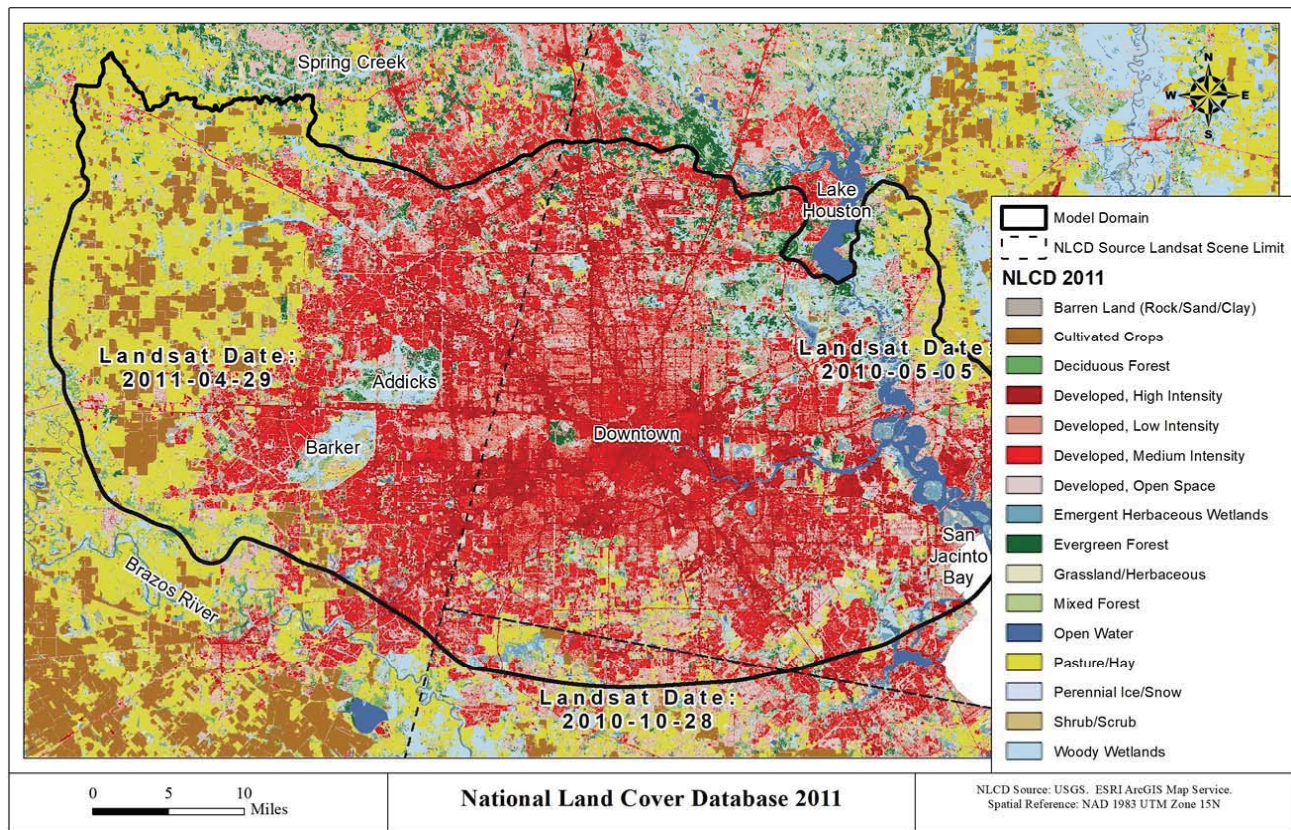


Figure 4-4: NLCD land use classifications within the model domain.

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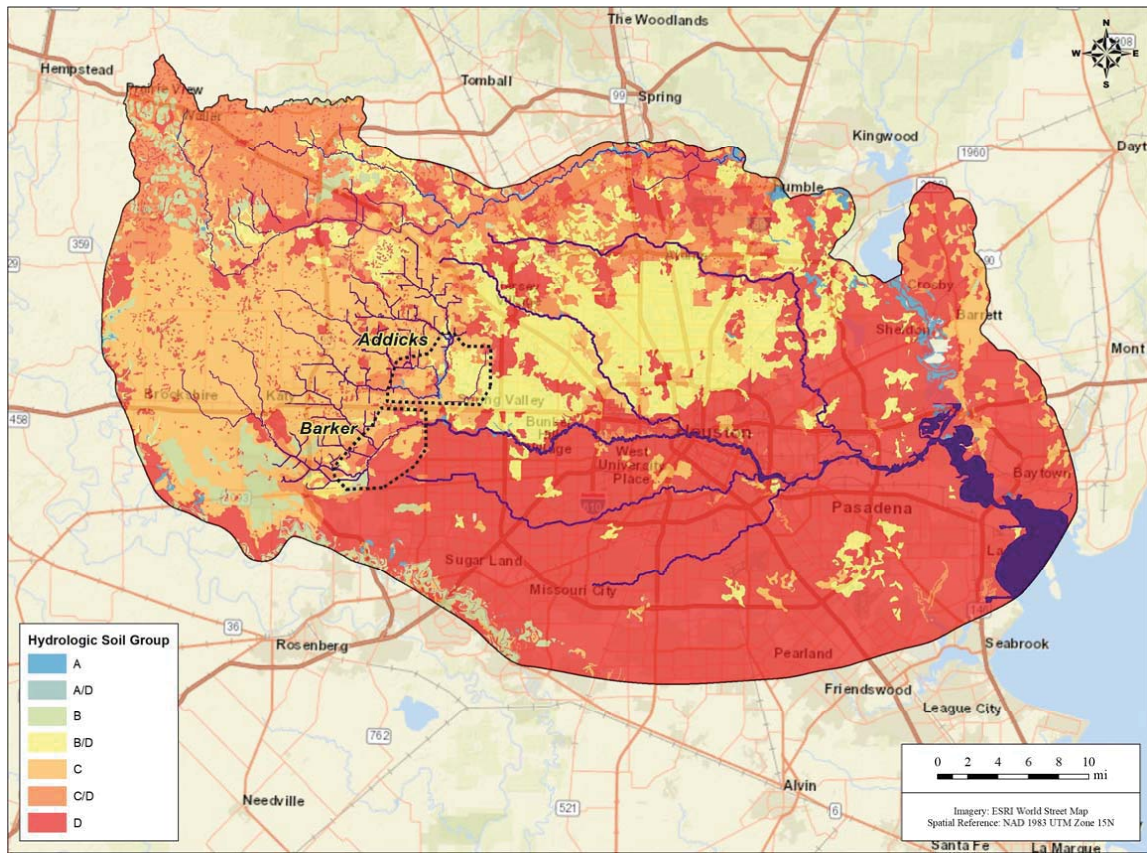


Figure 4-5: Hydrologic soil groups within the model domain (downloaded from [37])

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4.4.3.4 Manning's Roughness

Manning's n ranges derived in Section 3.3 are summarized in Table 4.3 for the main streams within the Focus Area. For the remainder of the watershed, the National Landcover Database 2011 (NLCD 2011, [35]) was used to define land classes for the model domain. National Land Cover Database 2011 (NLCD 2011) is the most recent national land cover product created by the Multi-Resolution Land Characteristics (MRLC) Consortium [35].

Manning's roughness formulation is used to parameterize the over ground sheet flow using spatially varied Manning's n roughness coefficients. Manning's roughness coefficients are assigned to mesh nodes based on land cover classes as proposed by [39] and presented in Table 4.4.

Table 4.3: Manning's n derived ranges for main streams within the Focus Area.

Stream Name	Manning's n derived values ($m^{-1/3}.s$)	
	Channel	Floodplain
Lower Buffalo Bayou	0.03 – 0.08	0.1 – 0.28
Upper tributaries	0.015 – 0.06	0.1 – 0.2

Table 4.4: Manning's n assigned values for various NLCD land cover classes within the model domain.

NLCD Class No.	NLCD Class Name	Manning's n ($m^{-1/3}.s$) [39]
21	Developed open space	0.020
22	Developed low intensity	0.050
23	Developed medium intensity	0.100
24	Developed high intensity	0.130
31	Barren land (rock/sand/clay)	0.090
32	Unconsolidated shore	0.040
41	Deciduous forest	0.100
42	Evergreen forest	0.110
43	Mixed forest	0.100
51	Dwarf scrub	0.040
52	Shrub/scrub	0.050
71	Grassland/herbaceous	0.034
72	Sedge/herbaceous	0.030
73	Lichens	0.027
74	Moss	0.025

81	Pasture/hay	0.033
82	Cultivated crops	0.037
90	Woody wetlands	0.140
91	Palustrine forested wetland	0.100
92	Palustrine scrub/shrub wetland	0.048
93	Estuarine forested wetland	0.100
94	Estuarine scrub/Shrub wetland	0.048
95	Emergent herbaceous wetlands	0.045
96	Palustrine emergent wetland (persistent)	0.045
97	Estuarine emergent wetland	0.045
98	Palustrine aquatic bed	0.015
99	Estuarine aquatic bed	0.015

4.4.3.5 Hydraulic Structures

The model domain includes Addicks and Barker dams, which are represented in the model as topographic features, where mesh elements are refined enough to represent the embankments. Similarly, auxiliary spillways at both ends of each dam are represented as topographic features. Flow through gated conduits is estimated as a function of the gate height and head water elevation (refer to Section 3.9).

Other hydraulic structures within the Focus Area include culverts and other smaller stormwater drains. As discussed in Section 4.3.5.2, only major culverts conveying water across major roads that were not overtopped during the Harvey Event have been included in the model. Major culverts included in the model are shown in Figure 4-6.

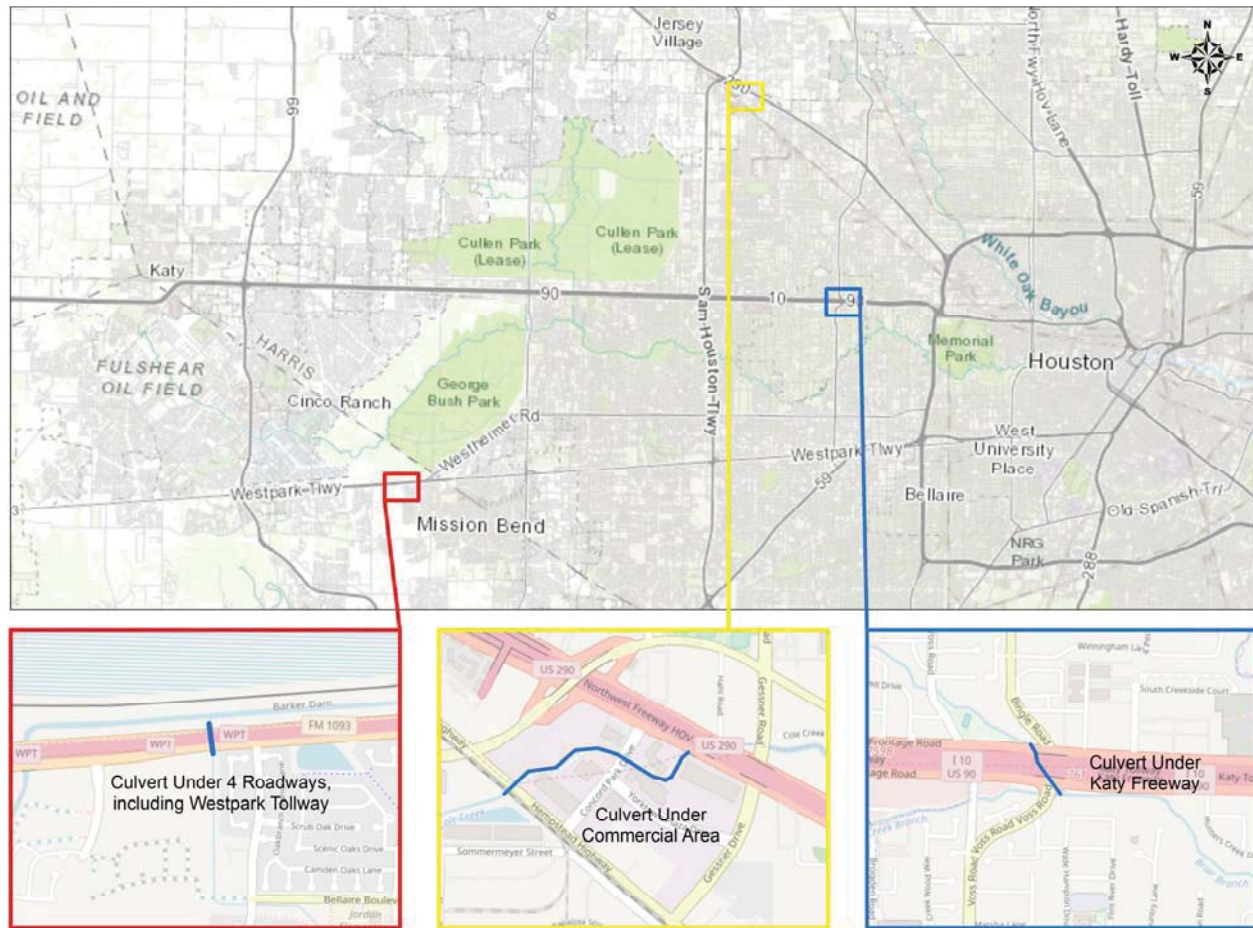


Figure 4-6: Major Culverts Represented in TELEMAC 2D model.

4.5 Model Calibration

Model calibration is completed by adjusting roughness and hydrologic loss parameters so that the model agreement with measured gage data within the Focus Area and Focus Period is maximized.

The objective of the TELEMAC model calibration is two-fold: 1) to capture the peak water surface elevations and their timing within the Focus Area during the Focus Period; and 2) to capture the rise (in downstream areas) and the fall (in upstream areas) in water surface elevations within the Focus Area due to releases from Addicks and Barker Reservoirs.

4.5.1 Acceptable Criteria

This section defines a set of model performance metrics to help identify acceptable model calibration results within the focus area. These performance metrics have been defined considering the following:

- The main objective of the numerical model is estimation of inundation. As such, modelled stage (or water surface) elevations are assigned the most stringent acceptable criteria.
- Known acceptable criteria used by similar studies for similar applications.
- Model limitations as described above in Section 4.3.5.

- Consideration of accuracy and operational ranges of measurements. Within the focus area, some of the stream gages were operating beyond their operational limits.

The target (or desired) model performance criteria defined by [40] are adopted for this study. The following metrics are used to evaluate the goodness of model calibration for river water depth (or stage height) within the Focus Area and Focus Period based on modelled and observed data:

- Root mean square error percentage (RMSE%) less than 15% for all stations
- Pearson product-moment correlation coefficient (r)²⁸ greater than 0.9 for all stations

For flooding applications, the simulated free water surface elevation is the most important parameter since its spatial and temporal distribution defines overland flood depth and duration. Flow depth inside streams is of secondary importance since it is applicable to those streams. Since flow depth could be significantly impacted by local conditions at the points at which they are extracted (such as erroneous channel bed elevations, abrupt topographic changes in channel bed, rapidly varied flows that may not be represented by the model, etc.) they are much less reliable than water surface elevations for estimating overland flooding characteristics²⁹. For the purpose of model calibration, the RMSE% will be calculated for both water surface elevations and flow depths. For the purpose of estimating overland flooding extents and durations, water surface elevations will be used.

4.5.2 Flood Wave Speed Test

A flood wave speed test was completed using the TELEMAC model in order to verify this characteristic of the flood wave. A discharge signal of 4,200 cfs over 18 hours, with two 6-hour ramp up and ramp down periods, was released from Barker dam (near Highway 6). Figure 4-7 shows the simulated stage elevations below Barker dam at different stages using roughness values within the ranges presented in Table 4.3. Results show that the peak elevation corresponding to the flood wave at Piney Point is lagging the peak of the discharge signal by approximately 10 - 11 hours. This is consistent with the estimated time of travel for peak flows along lower Buffalo Bayou that is reported by the Reservoir Regulation Manual of 1962 [17]. It was estimated³⁰ that peak flows reach the mouth of Rummel Creek in approximately 6.4 hours and reach Piney Point Road in approximately 10.2 hours [17, p. USACE599479]. The USACE estimates compare well with the model results. It is noted that channel roughness, runoff discharge and release rates affect the travel time through Buffalo Bayou. Therefore, calibration of Manning's roughness values is essential, which is addressed below in Section 4.5.5.

²⁸ A value of correlation coefficient " r " closer to 1 indicates better fit between modelled and measured data.

²⁹ If flow depths were used to estimate overland flooding, the results may be significantly skewed as a result of any inaccuracies in local land or bed elevations.

³⁰ USACE used the coefficient method to route the discharge downstream [17, p. USACE599477].

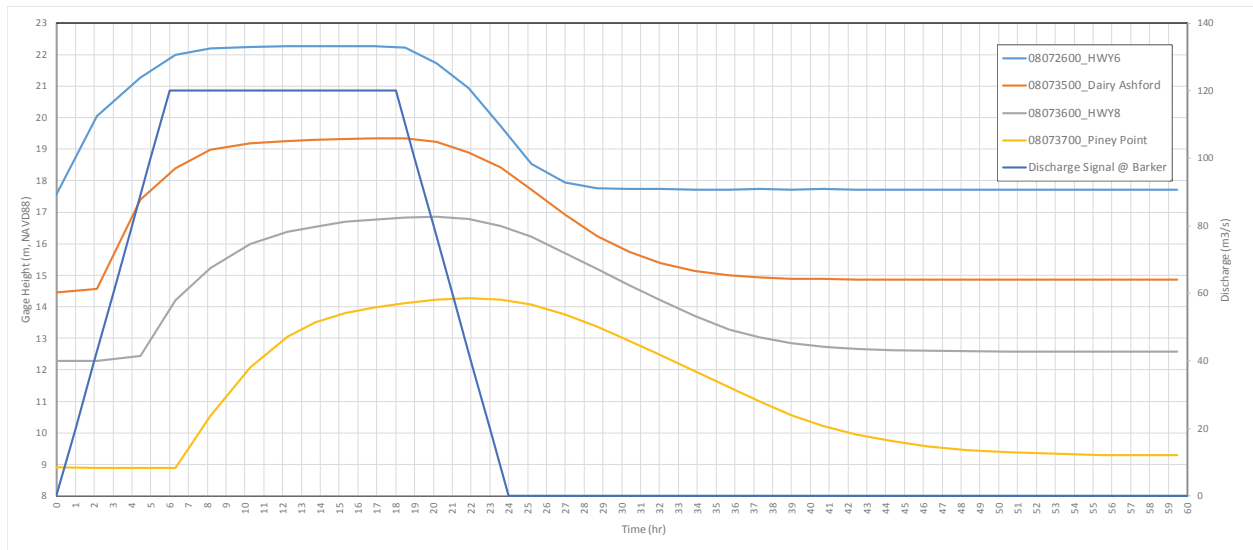


Figure 4-7: Propagation of flood wave along lower Buffalo Bayou.

4.5.3 Initial Conditions (August 25, 2017)

4.5.3.1 Base Flows and Stages

To establish base flows in Buffalo Bayou and its major tributaries, a hypothetical TELEMAC 2D model run was completed with the objective of filling the streams up to observed stage elevations on 8/25/2017 00:00. For the purpose of this run, a uniform rainfall intensity of 0.5 in/hr was applied to the entire model domain over a duration of 12 hours with a constant Curve Number (CN) = 99 throughout the entire domain. Prior to the Harvey Event, flow through streams and bayous within the Focus Area were insignificant. Therefore, base flows are expected to have a negligible effect on model results.

4.5.3.2 Antecedent Soil Moisture Conditions

The Antecedent Moisture Condition (AMC) represents the amount of water in the soil prior to the rainfall event under consideration. It is a modification of CN values to reflect the effects of prior rainfall events and soil moisture conditions.

In conceptual terms, AMC affects the abstractive hydrological losses (including the ability of the soil to absorb water during a rainfall event), and therefore affects the amount of runoff generated from a given area. The AMC is categorized into three conditions: AMC I, AMC II, and AMC III. AMC I represents soils that are dry and are able to infiltrate a greater amount of water (generating less runoff), AMC II represents soils that have an average moisture condition, and AMC III represents soils that are wet and are less able to infiltrate water (generating more runoff).

The antecedent moisture content of a soil depends on:

- Intensity, duration and timing of prior rainfall events
- Soil type; in particular, soil texture
- Slope length and steepness
- Position of an area within a watershed
- Land use and land cover
- Human modifications, such as irrigation and drainage

In the SCS-CN method, the use of different AMC values is a method of accounting for part of the variability in the rainfall-runoff relationship. AMC II is used to represent the central values in the rainfall-runoff relationship, whereas AMC I represents conditions of lower runoff potential and AMC III represents conditions of higher runoff potential. As such, AMC is a surrogate to account for the variability in the rainfall-runoff relationship, and it becomes a method of calibrating the amount of runoff predicted by the SCS-CN approach.

The SCS method prescribes AMC selection based on the total 5-day antecedent rainfall, and whether the area is in the dormant or growing season (SCS, 1985 [41]). However, this relationship was developed for an unspecified region, not accounting for regional differences or scale effects. Echoing this concern, SCS deleted this relationship from the 1993 [42] update of the approach [43].

In practice, AMC category is typically selected by the modeler to produce the best fit between predicted and observed runoff values. Estimated conditions of soil moisture content prior to the Harvey Event were relied on to determine the variation in AMC across the study area, and then the resultant runoff predictions were validated against gage observations. The sensitivity of the model was also tested with varying AMC values, and it was confirmed that the final choice of AMC values provided the most appropriate fit to observed runoff (refer to Section 4.5.5).

For the Harvey Event, the antecedent soil moisture predictions were available from NASA (Figure 4-8). The soil moisture content dataset shown in the figure is a 3-km resolution Volumetric Soil Moisture of the soil profile³¹. AMC varied significantly from west of downtown Houston to east of downtown Houston. In the figure, the red and grey areas represent a low AMC, the green areas represent a high AMC, and the other colored areas represent moderate AMC. Consistent with these data, areas to the northwest of the domain were assigned curve numbers for AMC I, soils upstream of the dams were assigned curve numbers for AMC II, and soils in the remainder of the domain were assigned curve numbers for AMC III. Figure 4-9 shows the AMC categories assigned to the sub-watersheds.

The antecedent moisture conditions for the watersheds were used to assign curve numbers throughout the model domain. Curve number can be adjusted using the following equations for AMC I and AMC III [44]:

$$CN_{AMC\ I} = \frac{4.2 \times CN_{AMC\ II}}{10 - 0.058 \times CN_{AMC\ II}}$$

$$CN_{AMC\ III} = \frac{23 \times CN_{AMC\ II}}{10 + 0.13 \times CN_{AMC\ II}}$$

The values from the SCS method (see Table 4.2) represent the curve numbers for AMC II. For AMC I, the curve number will decrease, which allows for greater hydrological losses. For AMC III, the curve number will increase, which allows for less hydrological losses. The curve number map (Figure 4-10) used as input to the TELEMAC 2D model was prepared based on AMC (Figure 4-9), land use (Figure 4-4) and HSG (Figure 4-5).

³¹ NASA's predictions are based on real-time SPoRT-LIS (Short-term Prediction Research and Transition Center - Land Information System) [55]. "The real-time LIS consists of a continuous integration of the Noah land surface model which is same land surface model used in the operational National Centers for Environmental Prediction (NCEP) North American Mesoscale model."

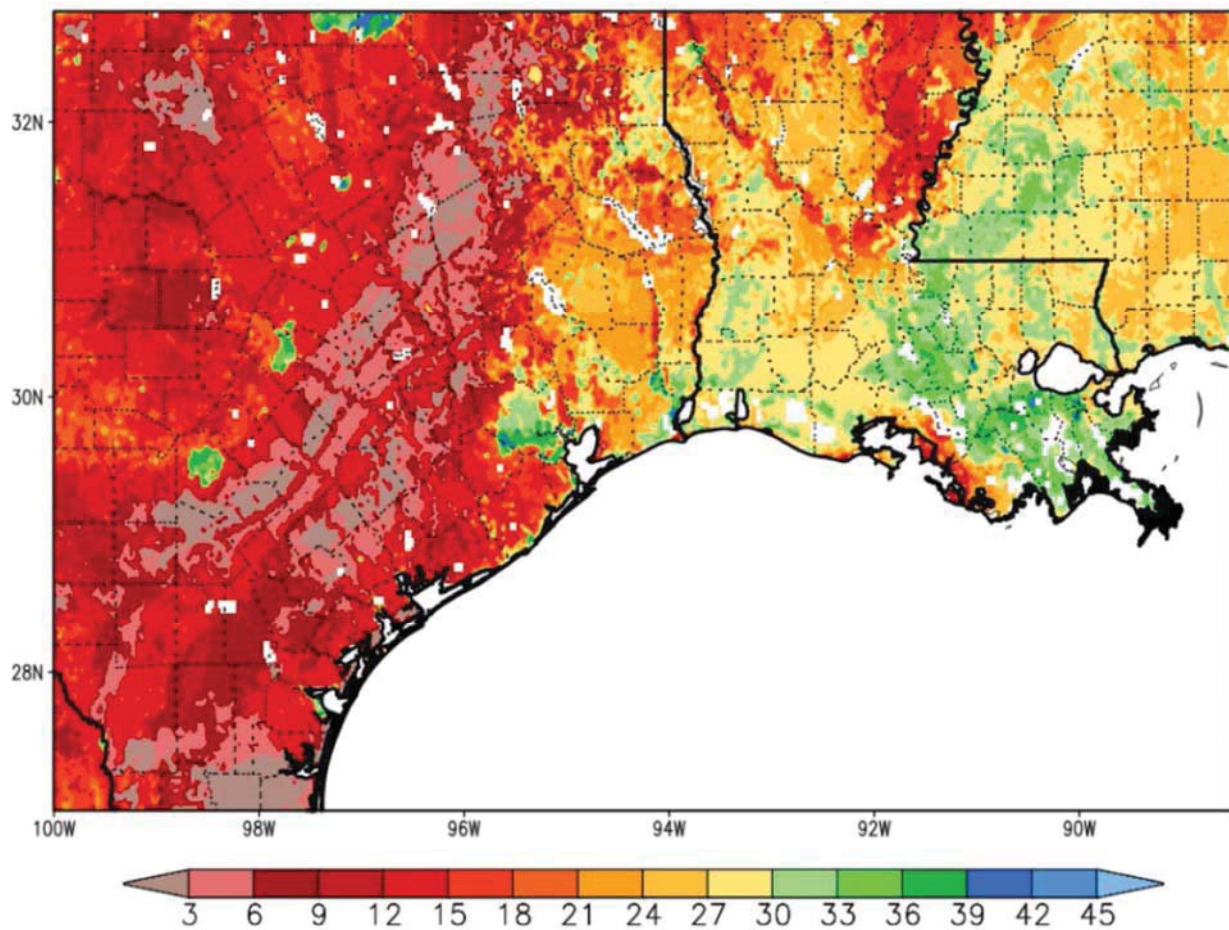


Figure 4-8: Percent volumetric soil moisture content, 8/25/2017 (NASA, n.d.) [45, p. FEMA000315]

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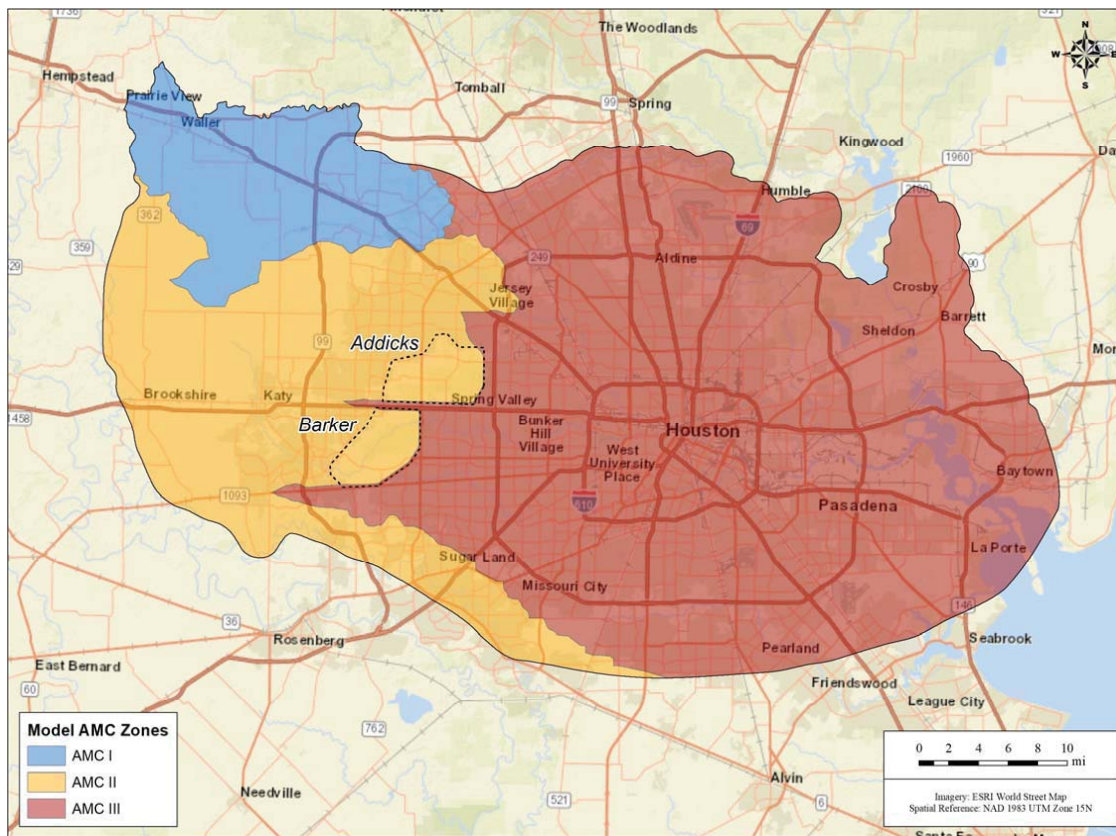


Figure 4-9: Antecedent soil moisture conditions for the model domain (yellow: AMC I, blue: AMC II; green: AMC III)

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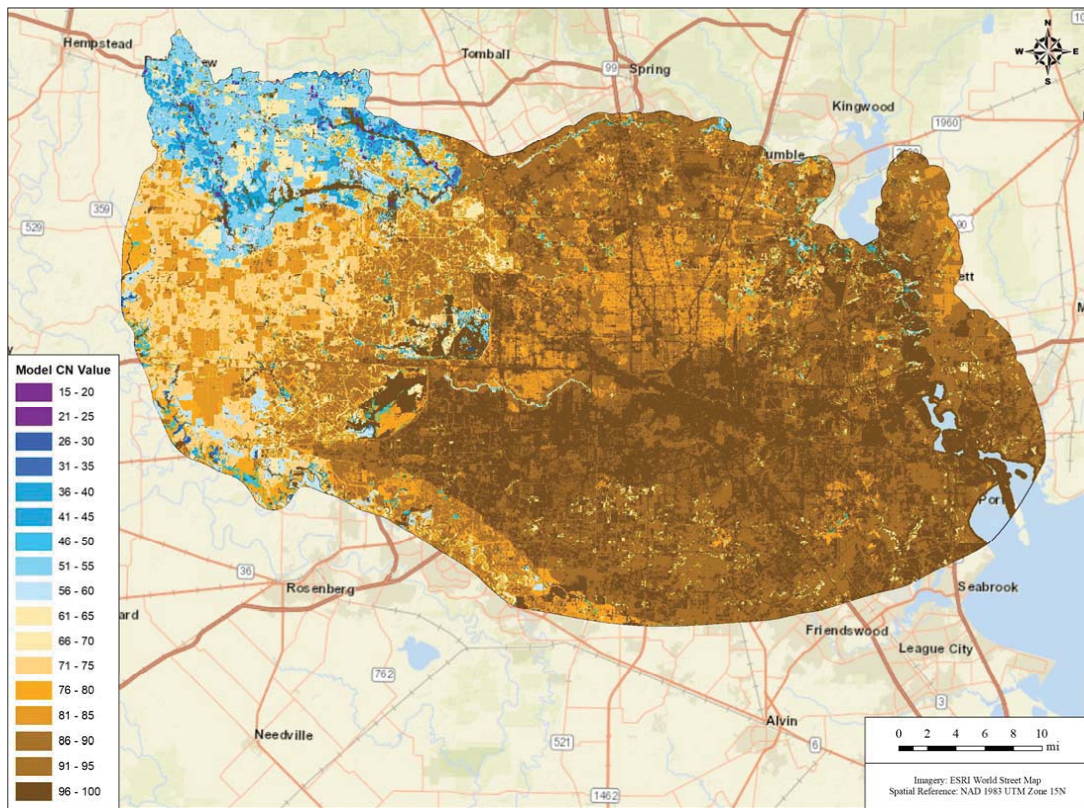


Figure 4-10: Curve Number Map covering the model domain.

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4.5.4 Model Sensitivity

4.5.4.1 Sensitivity to Courant Number (or Time Step)

The Courant number C is defined as follows:

$$C = u \frac{\Delta t}{\Delta x}$$

where u is the characteristic speed (flow speed or flood wave speed), Δt is the computational time step and Δx is the size of the computational grid (or mesh size) at a certain location with the model domain. A lower Courant number essentially dictates that a smaller computational time step may be required to represent a wave moving across mesh nodes. The TELEMAC 2D model employs an implicit solver, which is theoretically unconditionally stable, where relatively high Courant numbers (or longer time step) can be used. The model sensitivity to Courant number has been tested by comparing the model results for desired Courant numbers of 5 and 10. It is concluded that the model results are not sensitive to Courant numbers within the tested range. Explicit model solvers must operate in the range of Courant number less than 1.

4.5.4.2 Sensitivity to Rainfall Spatial Variability

The importance of rainfall spatial variability has been tested by comparison of model results for the following two scenarios:

- Spatially variable rainfall intensities (provided by [14]); and
- Spatially constant rainfall, where rainfall intensities measured at Barker Dam (near the center of the model domain) have been assumed to represent the entire domain.

Simulated water surface elevations under these scenarios were significantly different. It is concluded that rainfall spatial variability is of paramount importance and must be considered in the analysis.

4.5.4.3 Sensitivity to Time Interval of Rainfall Intensity

The model sensitivity to the time interval of rainfall intensity has been tested by running the model using HCFCD rainfall gage data with 15 min and 1 hr intervals. It is concluded that for the Harvey Event, the model is not sensitive to time interval of rainfall intensity within the tested range, as the results are almost identical.

4.5.4.4 Sensitivity to Wind Forcing

The impact of wind has been tested by comparison between model results with and without wind forcing. The same roughness and infiltration parameters were used for both scenarios. It is concluded that the model is generally not sensitive to wind forcing and the hydraulics is dominated by rainfall, infiltration and runoff.

4.5.4.5 Sensitivity to Tides and Storm Surge Conditions

The impact of tidal conditions and storm surge at Galveston Bay on model results within the Focus Area has been tested by comparing model results for the following transmissive open boundary conditions at Galveston Bay:

- Actual measured water surface elevations (including tides and storm surge) imposed at the open boundary; and
- Stationary water surface elevation imposed at the open boundary.

Figure 4-11 illustrates an example of model results for both scenarios at USGS gage 08074000 at Shepherd Drive (located at the downstream limit of the Focus Area). Pearson product-moment correlation coefficients between results of these two scenarios at various stream gages within the Focus Area are summarized in Table 4.5. It is concluded that storm surge has not significantly impacted the flooding characteristics (neither depth nor duration) within the Focus Area.

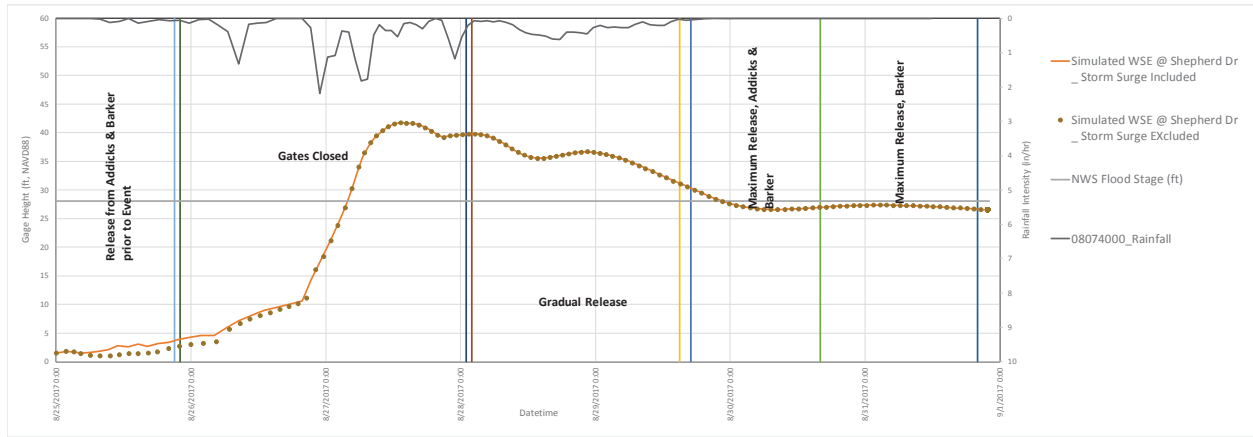


Figure 4-11: Simulated water surface elevations with and without storm surge at USGS Gage 08074000 at Shepherd Drive.

Table 4.5: Correlation between model results with and without storm surge.

Stream Gage	R
Upstream of Addicks Dam	
08073000 @ Addicks Res.	1.000
08072760 @ Langham CK_1	0.999
HCFC_D_Horsepen Ck @ Trailside	0.999
08072800 @ Langham CK_2	1.000
08072730 @ Bear Ck	0.998
08072680 @ South Mayde Ck	1.000
Upstream of Barker Dam	
08072500 @ Barker Res.	1.000
08072350 @ Upper Buffalo Bayou	1.000
HCFC_D_Mason Cr @ Prince Cr Rd	1.000
Downstream of Addicks and Barker Gates	
08072600 @ Barker	1.000
08073500 @ Dairy Ashford Rd	0.999
HCFC_D_Rummel Creek @ Brittmoore Rd	0.994
08073600 @ Beltway 8	0.999
08073700 @ Piney Point	1.000
HCFC_D_Stage BB @ San Felipe	1.000
08074000 @ Shepherd Dr	0.999

4.5.4.6 Roughness and Hydrologic Loss Parameters

The model sensitivity to roughness and hydrologic loss parameters are addressed in Section 4.5.5.

4.5.4.7 Summary of Model Sensitivity

Table 4.6 provides a summary of the model sensitivity to various parameters. The “Base Run” column presents the parameters considered for model calibration and other production runs.

Table 4.6: Summary of TELEMAC model sensitivity results

Sensitivity Parameter	Base Run	Range tested	Conclusion
Courant Number	10	(5 – 10)	Not sensitive.
Rainfall spatial variability	Spatially variable	Spatially constant (using Gage 2010 at Barker Dam)	Spatial variability must be included.
Time interval of rainfall intensity	1 hour	(15 – 60) min	Model results are not sensitive within the tested range.
Wind	Time and space variable	Calm and Spatially and temporally varied wind	Model results are not sensitive to wind.
Tides and Storm Surge	Tides and storm surge included.	No tide or storm surge; and Tides and storm surge included.	Within the Focus Area, the model results are not sensitive to tides or storm surges.

4.5.5 Development of Actual Hurricane Harvey Scenario

Measured stage elevations at various stream gages within the Focus Area were used to calibrate the two-dimensional TELEMAC model during the Focus Period (between 8/26/2017 and 9/12/2017) covering the entire period of reported flooding including two distinctive flow regimes downstream of the dams: 1) runoff dominated flow regime in lower Buffalo Bayou during the period of gate closure and most intense rainfall; and 2) flood wave dominated flow regime during the period of release from Addicks and Barker Reservoirs with no measurable rainfall.

4.5.5.1 Initial Calibration

The TELEMAC 2D model calibration was performed by changing roughness and hydrologic loss parameters within their respective realistic ranges (derived above in Section 4.4.3). For the purpose of initial calibration, RMSE% and correlation coefficient (r), as defined in Section 4.5.1, were calculated for each gage within the Focus Area and averaged over the following three zones:

- Zone A: Upstream of Addicks dam
- Zone B: Upstream of Barker dam
- Zone C: Downstream of Addicks and Barker dams

Three channel roughness scenarios have been prepared for the purpose of model calibration as follows:

- Scenario I: Rough channels scenario
- Scenario II: Intermediate roughness scenario
- Scenario III: Smooth channels scenario

Manning's roughness maps representing the three roughness scenarios have been prepared as described in Table 4.7, where Manning's n ranges have been selected based on derived values (refer to Section 3.3).

Table 4.7: Ranges of Manning's n for stream and floodplains within the model domain.

Topographic features	Manning's n		
	Scenario I (rough)	Scenario II (intermediate)	Scenario III (smooth)
Land areas including reservoirs	Manning's n defined by Mattocks & Forbes (2008) [39]		
Streets	0.013 [46, p. 111]		
All channels outside Focus Area	0.035 [46, p. 112]		
Zone A: Upstream of Addicks Dam			
Langham Creek (channel / floodplain)	0.04 / 0.1	0.03 / 0.1	0.02 / 0.1
Horsepen Creek (channel / floodplain)	0.04 / 0.1	0.03 / 0.1	0.02 / 0.1
Dinner Creek (channel / floodplain)	0.04 / 0.1	0.03 / 0.1	0.02 / 0.1
U106-13-00	0.08	0.05	0.02
Langham Creek Diversion channel	0.04	0.03	0.02
Bear Creek	0.04	0.03	0.02
South Mayde Creek (channel / floodplain)	0.08 / 0.1	0.05 / 0.1	0.02 / 0.1
Channel inside reservoir	0.04	0.03	0.02
Zone B: Upstream of Barker Dam			
Upper Buffalo Bayou	0.04	0.03	0.02
Willow Fork diversion channel	0.04	0.03	0.02
Mason Creek	0.04	0.03	0.02
Trib 52.9	0.04	0.03	0.02
Channel inside reservoir	0.04	0.03	0.02
Zone C: Downstream of Dams			
Buffalo Bayou from Barker gates to Dairy Ashford Road	0.08	0.05	0.02
Lower Langham Creek	0.06	0.04	0.02
Buffalo Bayou below Dairy Ashford Rd	0.06	0.04	0.02
Buffalo Bayou floodplain up to Dairy Ashford Road	0.22	0.22	0.22

Buffalo Bayou floodplain below Dairy Ashford Road up to Piney Point	0.20	0.20	0.20
Buffalo Bayou floodplain below Piney Point	0.16	0.17	0.18
Rummel Creek (channel / floodplain)	0.06 / 0.22	0.04 / 0.22	0.02 / 0.22
Clodine Ditch (channel / floodplain)	0.035 / 0.22	0.025 / 0.22	0.015 / 0.22

Curve Number (CN) maps representing low, intermediate and high hydrological losses scenarios have been prepared as follows:

- CN Base Map 1 representing a low hydrologic losses scenario
 - AMC III assigned for areas downstream of Addicks and Barker dams; and
 - AMC II assigned for areas upstream of Addicks and Barker dams.
- CN Base Map 2 (Figure 4-10) representing an intermediate hydrologic losses scenario:
 - AMC III assigned for areas downstream of Addicks and Barker dams;
 - AMC II assigned for areas upstream of Addicks and Barker dams; and
 - AMC I assigned to areas for the northwest area of the model domain.
- CN Base Map 3 representing a high hydrologic losses scenario:
 - AMC III assigned for areas downstream of Addicks and Barker dams; and
 - AMC I assigned for areas upstream of Addicks and Barker dams.

Table 4.8 defines hydrologic losses and roughness parameters for the initial calibration runs representing the Harvey Event. The following model characteristics are common for all the runs:

- Rainfall intensities are based on gridded rainfall data derived by AWA (refer to Section 2.9)
- Bathymetry is defined by the 2008 LiDAR survey corrected for water depth using the HCFCD HEC-RAS transect data (refer to Section 2.4) and the 2018 LiDAR survey for Lower Langham Creek.
- Wind forcing is included
- Variable time step calculated based on a “desired”³² Courant Number of 10.
- Simulation from 8/25/2017 2:00 to 9/6/2017 1:00 (12 days)

The results of the initial calibration runs were used to calculate RMSE% for Addicks and Barker pool depths (representing Zones A and B)³³ and average RMSE% of flow depths over Zone C. Table 4.9, Table 4.10 and Table 4.11 present calculated RMSE% representing Zones A, B and C, respectively. For all of the calibration runs, starting around 8/27 (when gates were closed) the model overestimates pool elevations higher than 98 ft and 93 ft in Addicks and Barker Reservoirs, respectively. Above those elevations, the simulated rates of rise are higher than observed. This trend is independent of the roughness and hydrologic loss scenario as shown. As such, this overestimated rate of rise could potentially be attributed to one or more of the following:

- Temporal and spatial differences between estimated and actual rainfall intensities;
- The relatively coarse mesh upstream of the Focus Area may not capture significant low-lying areas and/or detention ponds.

³² The model calculates the next time step using the desired Courant number based on results at the present time step.

³³ Reservoir pool elevations are representative of their respective zones since they were controlling water surface elevations after 8/27/2017.

- Misrepresentation of the channel bathymetries upstream of the reservoirs³⁴.
- Misrepresentation of the reservoirs topography above elevations 98 ft (Addicks) and 93 ft (Barker); and/or
- Significant change to the topography³⁵ above those elevations between 2008³⁶ and 2017.

The overestimated pool elevations in Addicks and Barker Reservoirs may affect estimates of the timing of flooding in areas upstream of the reservoirs. The model is expected to estimate earlier peak elevations caused by backwater due to pool elevations higher than 98 ft and 93 ft in Addicks and Barker, respectively.

In addition, the model generally misses the first small peak of water surface elevation measured in most of the streams within the Focus Area at the early stages of the Harvey Event. This is likely attributed to storm drain flows (not included in the model) transferring water to the receiving bodies more rapidly than overland flow in the early stages of the storm (prior to surcharge of the drains)³⁷. The model, however, does well at predicting subsequent peaks of water surface elevation after storm drains became fully surcharged.

Table 4.8: Initial calibration model runs.

Model Parameters	CN Base Map 1 (Low Hydrologic Loss Scenario)	CN Base Map 2 (Intermediate Hydrologic Loss Scenario)	CN Base Map 3 (High Hydrologic Loss Scenario)
I: Rough channels scenario	I-1	I-2	I-3
II: Intermediate roughness scenario	II-1	II-2	II-3
III: Smooth channels scenario	III-1	III-2	III-3

Table 4.9: RMSE% calculated for Addicks pool depths for all initial calibration runs (minimum value is bolded).

Model Parameters	CN Base Map 1 (Low Hydrologic Loss Scenario)	CN Base Map 2 (Intermediate Hydrologic Loss Scenario)	CN Base Map 3 (High Hydrologic Loss Scenario)
I: Rough channels scenario	6.48%	5.88%	7.08%
II: Intermediate roughness scenario	7.11%	6.45%	7.07%
III: Smooth channels scenario	7.85%	7.15%	7.26%

³⁴ Unlike streams downstream of the reservoirs, elevations derived from HEC-RAS cross sections upstream of the reservoirs are very similar to the 2008 LiDAR.

³⁵ Such as excavation works above elevations 98 ft and 93 ft upstream Addicks and Barker, respectively.

³⁶ At the time of drafting this report, the 2008 LiDAR survey is the most recent source of reservoir topographies.

³⁷ This model is developed for and suited to extreme precipitation events, assuming storm drains are surcharged.

Table 4.10: RMSE% calculated for Barker pool depths for all initial calibration runs (minimum value is bolded).

Model Parameters	CN Base Map 1 (Low Hydrologic Loss Scenario)	CN Base Map 2 (Intermediate Hydrologic Loss Scenario)	CN Base Map 3 (High Hydrologic Loss Scenario)
I: Rough channels scenario	6.42%	6.33%	7.72%
II: Intermediate roughness scenario	6.35%	6.29%	7.42%
III: Smooth channels scenario	6.38%	6.35%	7.04%

Table 4.11: RMSE% averaged over Zone C for all initial calibration runs (minimum value is bolded).

Model Parameters	CN Base Map 1 (Low Hydrologic Loss Scenario)	CN Base Map 2 (Intermediate Hydrologic Loss Scenario)	CN Base Map 3 (High Hydrologic Loss Scenario)
I: Rough channels scenario	9.50%	9.37%	9.29%
II: Intermediate roughness scenario	9.25%	9.24%	9.35%
III: Smooth channels scenario	10.94%	11.05%	11.36%

4.5.5.2 Detailed Calibration

Results of the initial model calibration show that the optimum calibration for Zones A, B and C is at or near the center of the parameter space, corresponding to intermediate hydrologic loss and roughness scenarios (II-2). This provides general guidance for overall range of loss and roughness parameters. As shown from Table 4.9, Table 4.10 and Table 4.11, the minimum RMSE% for all zones are associated with the use of the CN Map 2, which is in agreement with the estimated antecedent moisture conditions presented in Figure 4-9.

For the purpose of detailed calibration, another CN map has been generated based CN Maps 2 and 3, as follows:

$$CN_4 = 0.9 \times CN_2 + 0.1 \times CN_3$$

Detailed calibration runs of the Harvey Event extending up to 9/14/2017 23:00 covering the entire Focus Period have been completed, where variations to Run II-2 Manning roughness coefficients and CN maps have been tested. Table 4.12 describes the detailed calibration runs. It was found that results of Run D012 yield the least RMSE% and the highest correlation coefficient within the Focus Area and the Focus Period. Table 4.13 presents RMSE%, correlation coefficients and bias calculated over the Focus Period for all the gages considered within the Focus Area using the results of D07. Results presented in Table 4.13 meet the acceptance criteria defined in Section 4.5.1.

The following list summarizes the calibrated Manning's n within the Focus Area (Zones A, B and C):

- Channels Upstream of Addicks Dam (Zone A):

- Langham Creek & Horsepen Creek are assigned Manning's $n = 0.10$ (floodplain) and $n = 0.03$ (channel)
- Dinner Creek is assigned Manning's $n = 0.03$ (channel)
- U106-13-00 is assigned Manning's $n = 0.05$
- Langham Creek diversion channel is assigned Manning's $n = 0.03$
- Bear Creek is assigned Manning's $n = 0.03$
- S. Mayde Creek is assigned Manning's $n = 0.10$ (floodplain) and $n = 0.05$ (channel)
- Channels inside reservoir are assigned Manning's $n = 0.03$
- Channels Upstream of Barker Dam (Zone B):
 - Upper Buffalo Bayou is assigned Manning's $n = 0.03$
 - Willow Fork Diversion Channel is assigned Manning's $n = 0.03$
 - Mason Creek is assigned Manning's $n = 0.03$
 - Tributary 52.9 is assigned Manning's $n = 0.03$
 - Channels inside reservoir are assigned Manning's $n = 0.03$
- Channels Downstream of the Dams (Zone C):
 - Lower Buffalo Bayou floodplain is assigned Manning's $n = 0.22$ up to Beltway 8; $n = 0.20$ from Beltway 8 to Piney Point and $n = 0.17$ from Piney Point to Shepherd Dr.
 - Lower Buffalo Bayou channel between Barker gates and Dairy Ashford Road is assigned Manning's $n = 0.06$
 - Lower Buffalo Bayou channel between Dairy Ashford Road and Beltway 8 is assigned Manning's $n = 0.04$
 - Lower Buffalo Bayou channel between Beltway 8 and Piney Point Road is assigned Manning's $n = 0.04$
 - Lower Buffalo Bayou channel between Piney Point Road and Shepherd Dr. is assigned Manning's $n = 0.04$
 - Lower Langham Creek (downstream of Addicks gates) is assigned Manning's $n = 0.05$
 - Rummel Creek channel is assigned Manning's $n = 0.06$
 - Clodine Ditch is assigned Manning's $n = 0.22$ (floodplain) and $n = 0.035$ (channel)

The calibrated model (Run D07 or The Actual Harvey Run) predicts peak water surface elevations and their timings within the Focus Area with a high degree of certainty. Differences between measured gage heights and simulated water surface elevations can be summarized as follows:

- The model overestimates pool elevations in Addicks and Barker Reservoirs between midday 8/27/2017 and midday 8/29/2017;
- The model underestimates pool elevations in Addicks Reservoir after 8/30/2017;
- The model overestimates water surface elevations downstream of the Beltway 8 after 9/5/2017.
- The model predicts peak pool elevations in both reservoirs about 1 day earlier than the timing of the peak pool elevation derived from the gage data.
- The model predicts the start of the spill around the north end of Addicks reservoir about 15 hours earlier than what is perceived by gage data. However, the model correctly estimates the duration of the period of spill around north end of Addicks.
- For all the streams draining into the reservoirs, the model does not capture the first water surface elevation peak that occurred the morning of 8/26/2017. However, the model captures all the other subsequent higher water surface elevation peaks.

Table 4.12: Summary of detailed calibration runs

Run ID	Variation to Run II-2	CN Map
D01	Rough channels scenario downstream of the dams. Floodplains roughness as per II-2.	2
D02	Rough channels scenario downstream of the dams. Floodplains roughness as per II-2 except below Piney Point where $n = 0.16$.	2
D03	Clodine Ditch: $n = 0.035$ (channel) and 0.22 (floodplain)	2
D04	Clodine Ditch: $n = 0.035$ (channel) and 0.22 (floodplain) Wind forcing not included	2
D05	Clodine Ditch: $n = 0.035$ (channel) and 0.22 (floodplain) Buffalo Bayou channel from Barker gates to Dairy Ashford Rd: $n = 0.08$	2
D06	Clodine Ditch: $n = 0.035$ (channel) and 0.22 (floodplain)	4
D07	Refined model bathymetry ³⁸ . Clodine Ditch: $n = 0.035$ (channel) and 0.22 (floodplain)	2

Table 4.13: Calculated calibration metrics for the Actual Harvey Run (D07).

Gage	RMSE% (Elevation)	RMSE% (Depth)	R	Bias
Zone A: Upstream of Addicks Dam				
08073000 @ Addicks Res.	1.38	4.97	0.99	0.00
08072760 @ Langham CK_1	1.24	20.62**	0.98	-0.01
HCFC_D_Horsepen Ck @ Trailside	1.53	24.35**	0.94	0.00
08072800 @ Langham CK_2	1.47	39.90**	0.95	0.00
08072730 @ Bear Ck	1.77	46.16**	0.96	-0.01
08072680 @ South Mayde Ck	1.88	36.22**	0.96	-0.01
Zone B: Upstream of Barker Dam				
08072500 @ Barker Res.	1.02	5.05	0.99	0.00
08072350 @ Upper Buffalo Bayou	1.45	16.57**	0.95	-0.01
HCFC_D_Mason Cr @ Prince Cr Rd	0.89	15.79**	0.97	0.00
Zone C: Downstream of Addicks and Barker Gates				

³⁸ Refined model bathymetry includes removal of blockages at Horsepen, Bear and Langham Creeks and adjustment of Lower Langham Creek bed elevation to match the 2018 LIDAR.

08072600 @ Barker	1.53	8.07	0.99	-0.01
08073100 @ Addicks	1.11	5.92	0.99	0.01
08073500 @ Dairy Ashford Rd	1.37	5.05	0.99	-0.01
HCFCFCD_Rummel Creek @ Brittmoore Rd	1.39	22.35**	0.97	0.00
08073600 @ Beltway 8	1.55	4.63	0.99	0.00
08073700 @ Piney Point	2.12	5.50	0.99	0.00
HCFCFCD Stage BB @ San Felipe St.	2.99	8.90	0.98	0.02
08074000 @ Shepherd Dr	7.51	7.82	0.92	0.02

* Calibration metrics calculated over the period from 8/28/2017 7:00 to 9/12/2017 23:00 due to doubts over reliability of gage height data at Shepherd Drive gage.

** High RMSE% values are due to incorrect channel bathymetries (refer to Section 2.4.1).

4.6 Model Validation

4.6.1 High Water Marks

Following (and during) the Harvey Event, HCFCFCD and USGS collected elevations of high water marks (HWM) at various locations. Locations of these high water marks within the Focus Area are presented in Figure 4-12 and Figure 4-13, totaling 262 HWM (57 by HCFCFCD and 205 by USGS). High water mark elevations represent the highest water surface elevation reached at their respective locations shortly before the date they were surveyed.

Some of the USGS HWMs were collected from bridges across lower Buffalo Bayou. During the Harvey Event, some of the bridge decks within the Focus Area were overtopped. As such, HWMs at bridge decks may underestimate peak water surface elevations. In addition, locations of HWMs at bridge decks along lower Buffalo Bayou are covered by gage data. Therefore, the HWMs were filtered by removing repeated marks and HWMs at bridge decks. The total number of filtered HWMs within the Focus Area is 169 (50 by HCFCFCD and 119 by USGS).

Simulated peak water surface elevations were compared to elevations of high water marks within the Focus Area. Figure 4-14 and Figure 4-15 present distributions of percent error in estimated peak water surface elevations within the Focus Area based on USGS and HCFCFCD HWMs, respectively. These figures show that the model estimates peak water surface elevations within the Focus Area with a high degree of certainty.

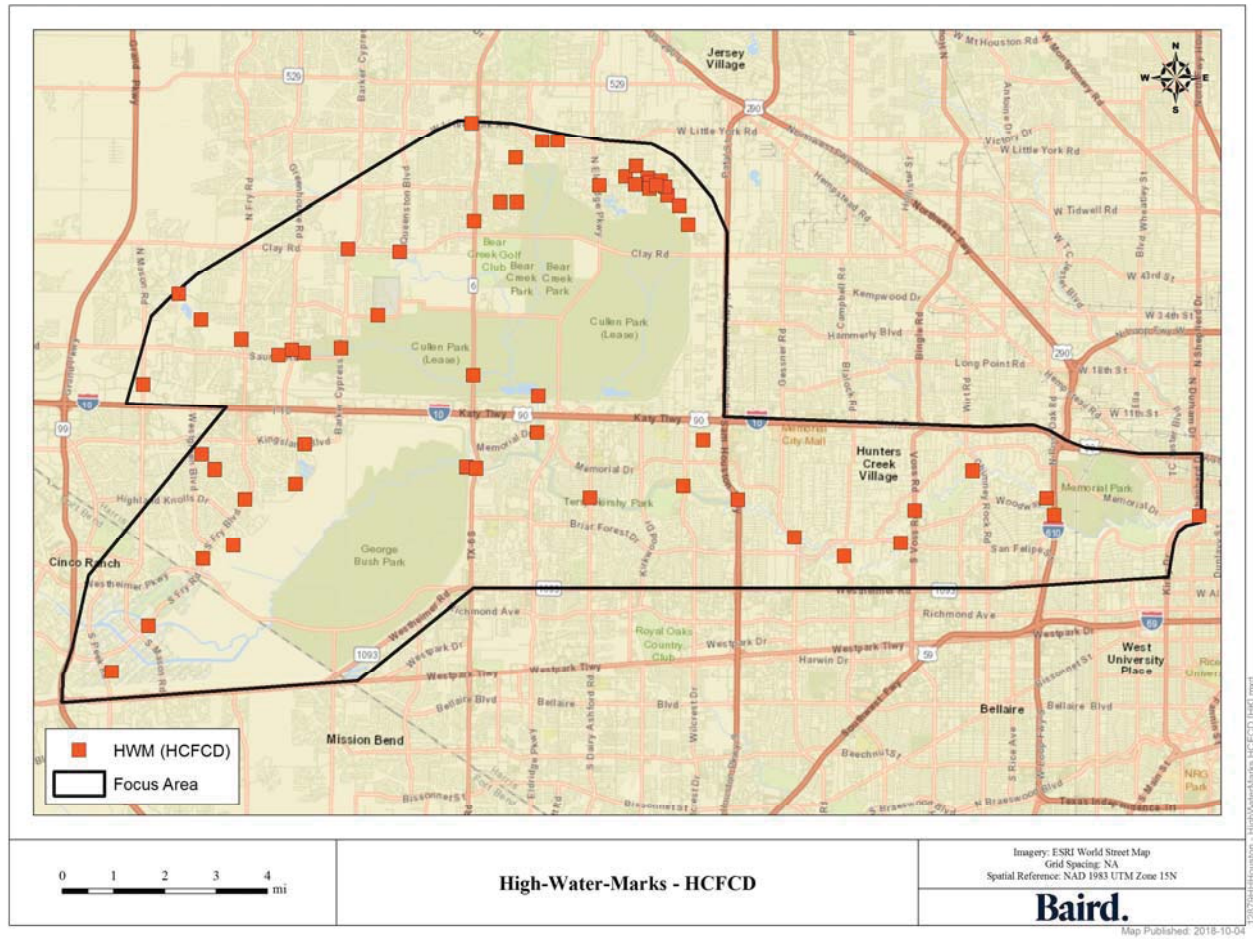


Figure 4-12: Map of High-Water Marks collected by HCFCF.

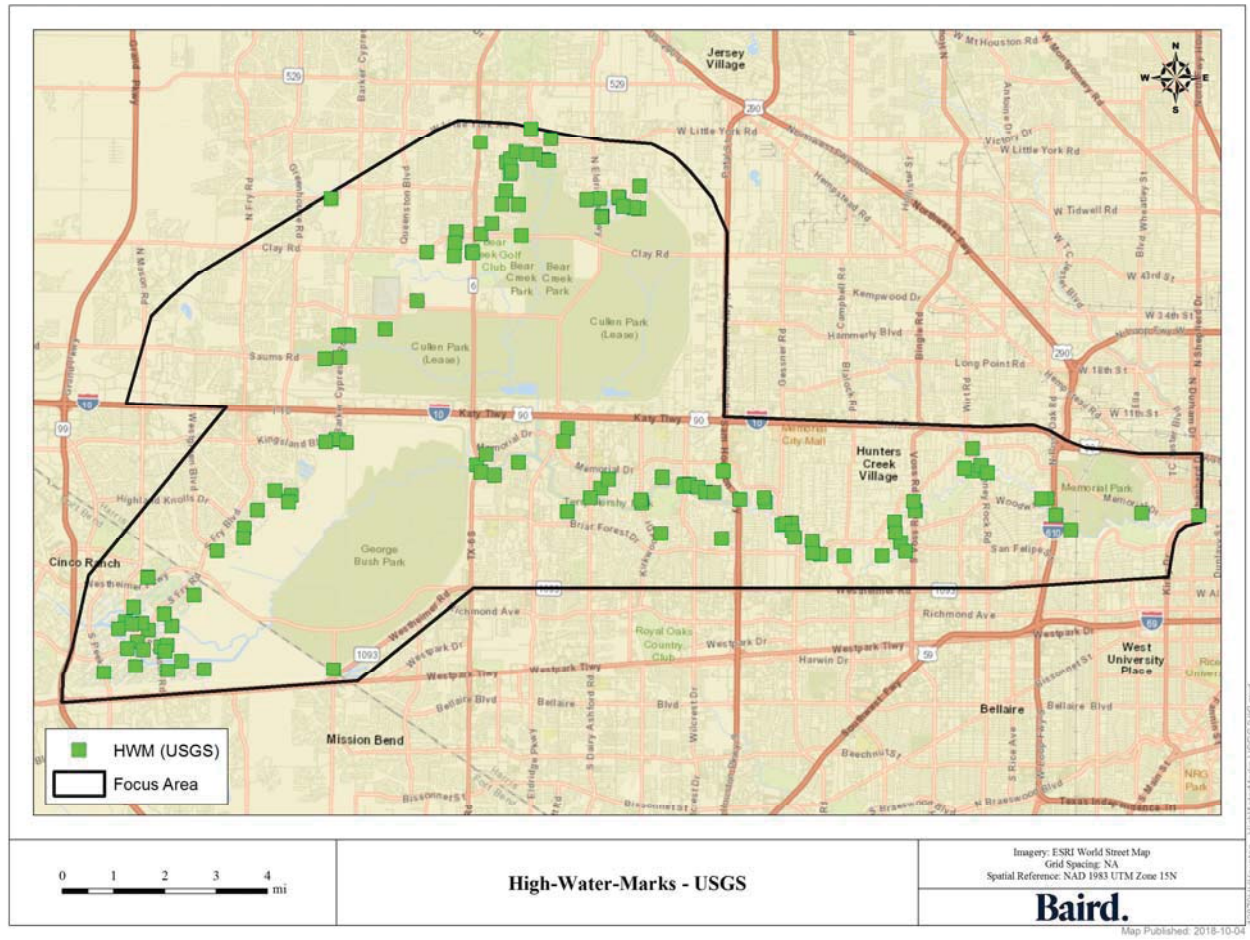


Figure 4-13: Map of High-Water Marks collected by USGS.

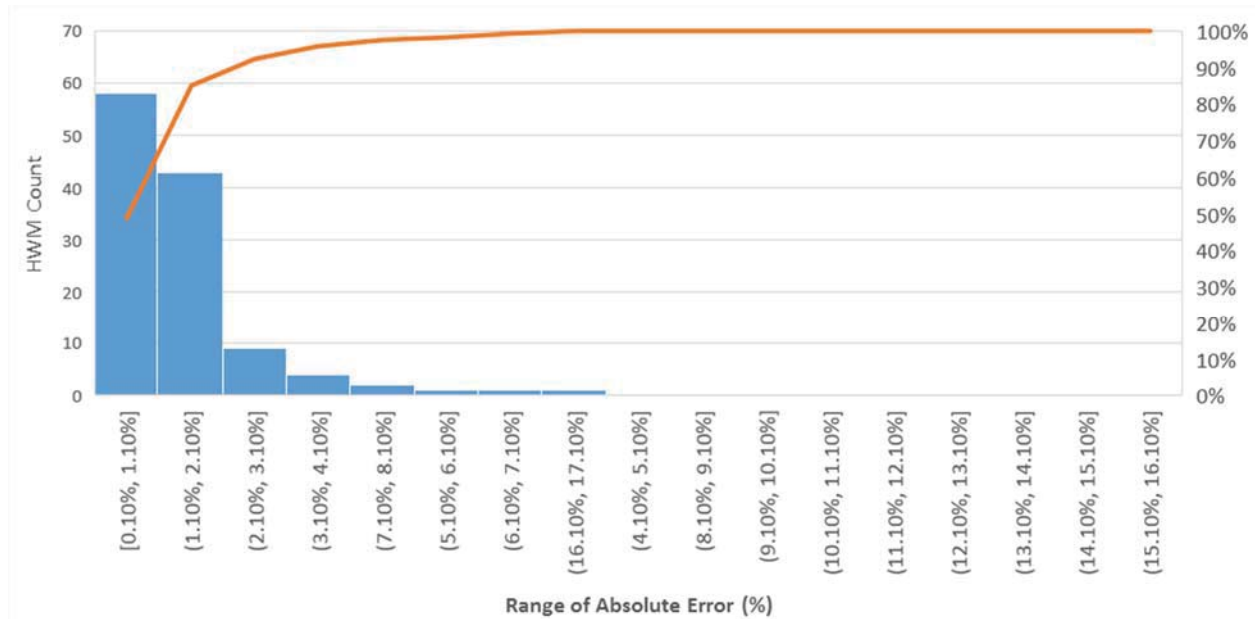


Figure 4-14: Distribution of % error in simulated peak water surface elevations (USGS HWMs).

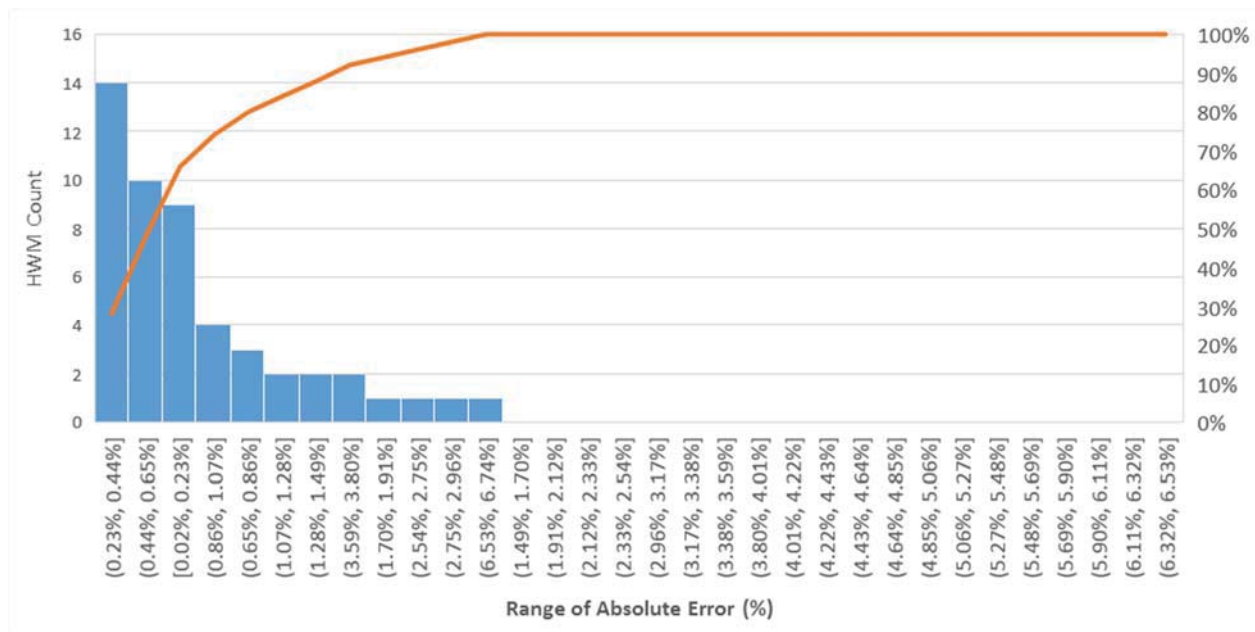


Figure 4-15: Distribution of % error in simulated peak water surface elevations (USGS HWMs).

4.6.2 Inundation Limits

For the assessment of the agreement between the simulated inundation extents and the observed water marks from aerial imagery, the procedure proposed by [47] is adopted, whereby the F1 index is defined as follows:

$$F1 = \frac{A}{A + B + C}$$

where, A to D represent the areas predicted wet or dry by the model and observed in the imagery data, as described in Table 4.14. F1 ranges from 0% (where there is no overlap between predicted and observed wet areas) to 100% (where observed and predicted wet areas coincide). As such, F1 index represents the degree of agreement between observed and predicted inundation limits as a percentage.

Observed inundation limits developed in Section 3.6 were compared to the model results. The NOAA mosaic aerial photos dated 8/30/2018 were acquired between 17:13 and 18:19. Therefore, inundation depths across the entire model domain were extracted on the nearest time step. Figure 4-16, Figure 4-17 and Figure 4-18 compare between observed and simulated inundation limits on 8/30/2018 in areas upstream Addicks Reservoir, upstream Barker Reservoir and downstream of the dams, respectively. The green area (Area A) represents agreement between observed and simulated limits, while Areas B (red) and C (blue) indicate overprediction and underprediction, respectively.

The F1 index was calculated for several parts downstream of the dams as follows:

- 84% below the reservoirs down to Shepherd Dr
- 87% below the reservoir down to Beltway 8
- 80% below Beltway 8 down to Shepherd Dr

It is concluded that the calibrated model estimates inundation limits within the Focus Area with a high degree of certainty.

Table 4.14: Parameters used to calculate the goodness of the fit between observed and predicted inundation limits. A and D represent areas predicted correctly.

	Model Wet	Model Dry
Image Wet	A	C (underprediction)
Image Dry	B (overprediction)	D

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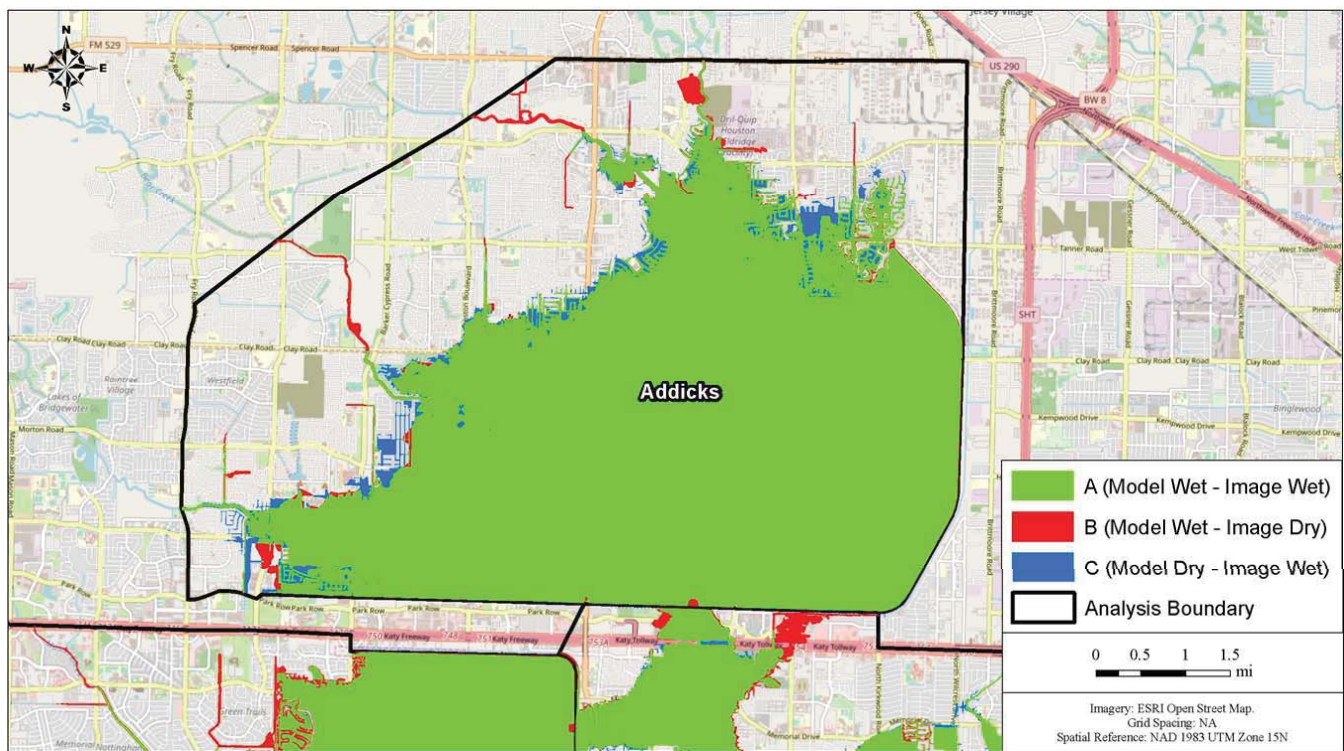


Figure 4-16: Comparison between simulated and observed inundation limits upstream of Addicks Reservoir on 8/30/2017.

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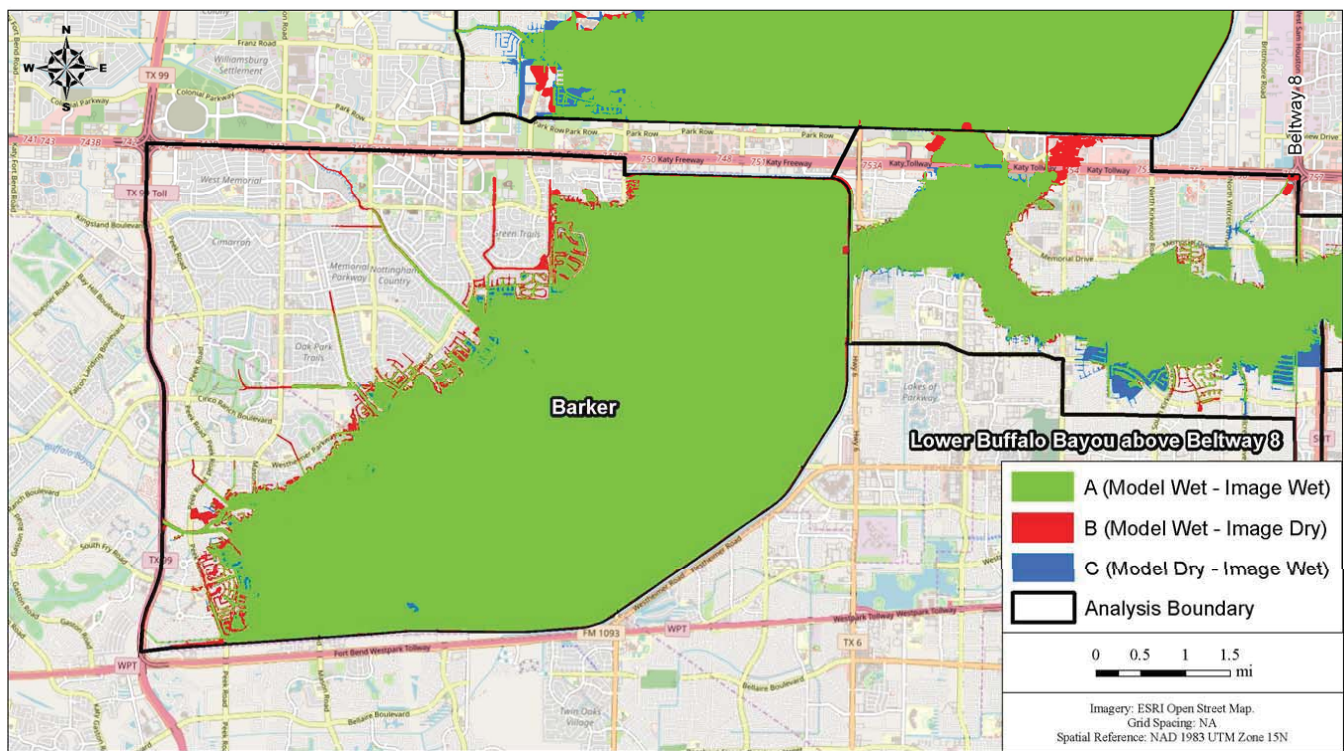


Figure 4-17: Comparison between simulated and observed inundation limits upstream of Barker Reservoir on 8/30/2017.

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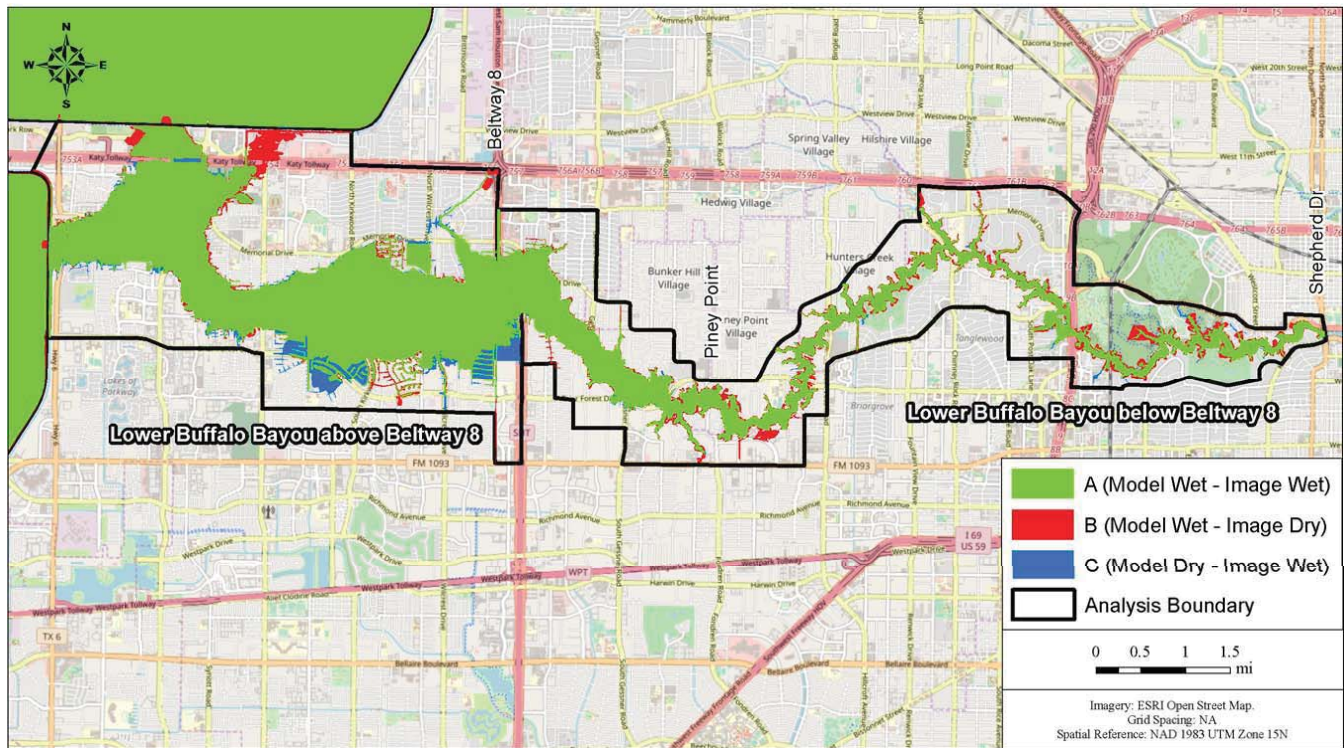


Figure 4-18: Comparison between simulated and observed inundation limits downstream of Addicks and Barker Reservoirs on 8/30/2017.

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5. Hydraulic Modelling of Physical Scenarios

The TELEMAC 2D was applied to assess flooding characteristics within the Focus Area associated the Harvey Event under various scenarios. This section provides a description of the model scenarios and presents results of simulated water surface elevations for each scenario at each Test Property.

5.1 Model Scenarios

Table 5.1 provides a description of TELEMAC 2D model scenarios. The following model runs have been considered:

- Actual Harvey Run: Representing actual Harvey-Event conditions upstream and downstream of the dams (developed in Section 4.5.5).
- No Project Run: Representing hypothetical conditions without the dams and channel improvements within the GOL.
- Gates Closed Run: Representing actual Harvey-Event conditions upstream and downstream of the dams under the hypothetical scenario where no releases were made from either reservoir.
- Gates Open Run: Representing actual Harvey-Event conditions upstream and downstream of the dams under the hypothetical scenario where gates were never closed and maximum releases were made.

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Table 5.1: Harvey-related TELEMAC 2D model runs

Model Run	Reservoir and Upstream Status	Downstream Status	Release
Actual Harvey	Actual	Actual	Actual
No Project	<p>Present urbanized conditions without the dams and without the federal improvements on GOL (1940 era conditions on GOL and present conditions on private land).</p> <ul style="list-style-type: none"> Topography as per the Actual Harvey Run without federal improvements on federal property and without the dams. Channel roughness as per the Actual Harvey Run Land use as per the Actual Harvey Run 	<p>Present urbanized conditions without the federal improvements.</p> <ul style="list-style-type: none"> Topography as per the Actual Harvey Run with the following changes: <ul style="list-style-type: none"> lower Langham Creek and Turkey Creek connected to the upper Creeks and W190-00-00³⁹ connected to upper Buffalo Bayou. Rectified section of lower Buffalo Bayou removed, and the 1940s era unrectified lower Buffalo Bayou introduced*. Channel roughness as per the Actual Harvey Run Land use as per the Actual Harvey Run 	Not applicable
Gates Closed	Actual as per the Actual Harvey Run	Actual as per the Actual Harvey Run	None
Gates Open	Actual as per the Actual Harvey Run	Actual as per the Actual Harvey Run	Ungated conduits (maximum)

* prepared based on Addicks and Barker Construction Drawings [48, p. USACE020403] and [49, p. USACE067122]

³⁹ Also known as "Clodine Ditch"

5.2 Model Results

5.2.1 Actual Harvey Run

The Actual Harvey Run represents the actual Harvey Event. As shown in Section 4.5.5, the calibrated model predicts peak water surface elevations and their timings within the Focus Area with a high degree of certainty as demonstrated in Sections 4.5.5 and 4.6. Comparison between simulated and measured water surface elevations are presented in Figure 5-1 to Figure 5-18. Simulated water surface elevations at upstream Test Properties are presented in Figure 5-19 to Figure 5-32. Table 5.2 presents summaries of the Actual Harvey Run model results for upstream Test Plaintiffs.

The federal project (Addicks and Barker Reservoirs) allows for the distribution of flooding impacts across a wide area to minimize the chance of life-threatening conditions in any one area. Simulated maximum flood depths above first finished floors for upstream Test Properties are between 0.2 to 4.8 ft. Despite the damage due to flooding, simulated depths above first floors could have been higher with much longer durations without the releases, leading to increased risk to life and property (refer to Section 5.2.3).

Peak flood elevations at all the upstream Test Properties are attributed to backwater due to high pool elevations in Addicks or Barker Reservoirs. Mr. Mario Mitchell's property, which is no longer a Test Property (as he sought dismissal of his claim), did not experience flooding as a result of backwater due to high pool elevations. At high pool elevations, the rate of rise decreases significantly due to the increased reservoir capacities at such elevations. As such, backwater flooding upstream of the reservoirs is characterized by a gradual rate of rise.

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Table 5.2: Summary of the Actual Harvey Run Results at Upstream Test Plaintiffs

Plaintiff	Elevations (ft, NAVD88)					Max Depth above First Finished Floor (ft)	Flooding duration in First Finished Floor
	Lowest Grade	Garage Elevation	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Lakes on Eldridge	106.3	-	108.4	108.9	-	0.5	1 day, 9 hr
Wind, Kurt & Jean	106.9	108.6	108.2	109.2	109.3	0.2	0 day, 22 hr
Mitchell, Stewart	105.7	108.5	108.0	109.0	-	0.4	1 day, 6 hr
West Houston Airport Corp.	106.6	-	107.5	108.6		0.8	2 day, 2 hr
Mitchell, Mario	119.9	121.5	121.1	121.9	-	1.8	1 day, 13 hr
Burnham, Elizabeth	102.6	105.0	104.0	105.5	-	3.9	6 day, 19 hr
Sidhu, Kulwant	105.1	-	106.3	107.1	116.7	2.3	4 day, 12 hr
Turney, Robert	101.7	104.2	103.8	104.7	-	4.8	7 day, 18 hr
Holland, Scott	106.1	107.4	107.2	107.8	-	1.6	3 day, 10 hr
Popovici, Catherine*	99.6	101.7	100.9	102.2	-	0.6	1 day, 18 hr
Soares, Elisio	98.7	100.7	100.0	101.1	-	1.7	3 day, 15 hr
Micu, Christina	97.7	99.6	98.9	99.8	-	3.0	5 day, 22 hr
Giron, Juan & Ann	99.0	101.0	100.2	101.0	101.5	1.8	4 day, 21 hr
Banker, Todd & Christina	97.6	100.2	99.6	100.7	-	2.1	4 day, 5 hr

* This property did not actually flood above FFE. The model overestimates the water surface elevations at this property.

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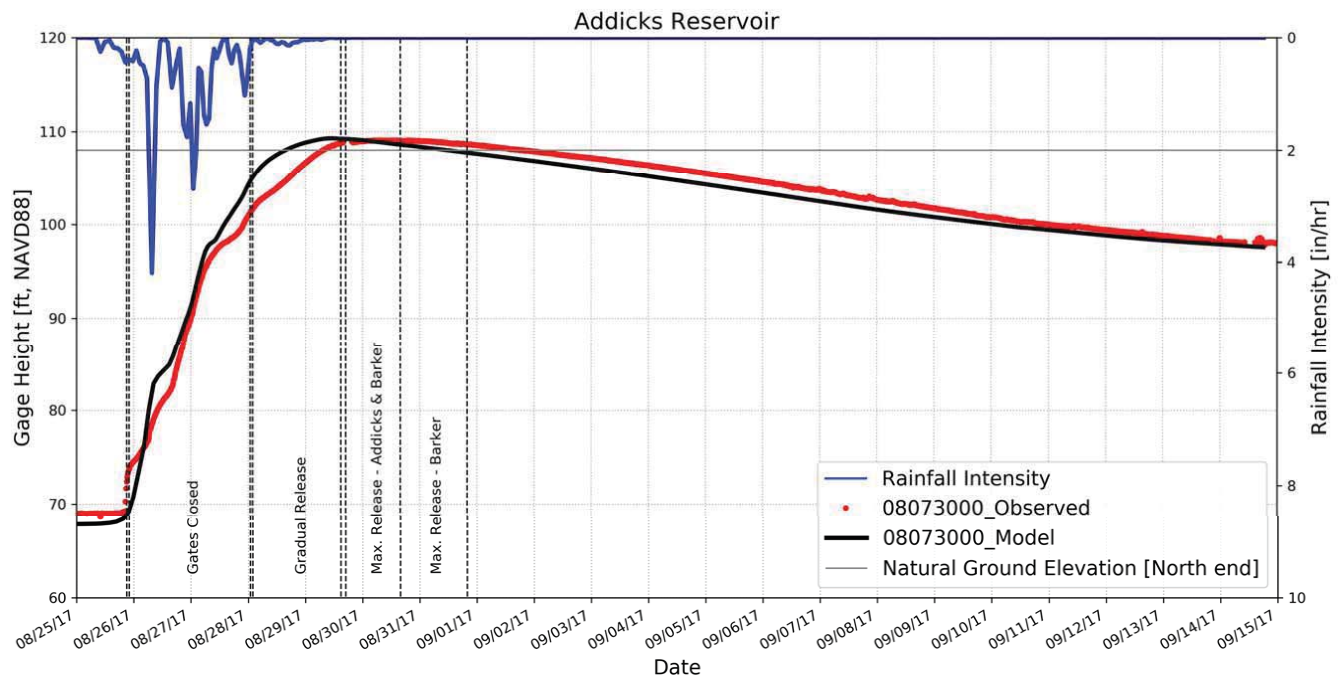


Figure 5-1: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08073000 upstream of the Addicks gates (Addicks reservoir pool elevations).

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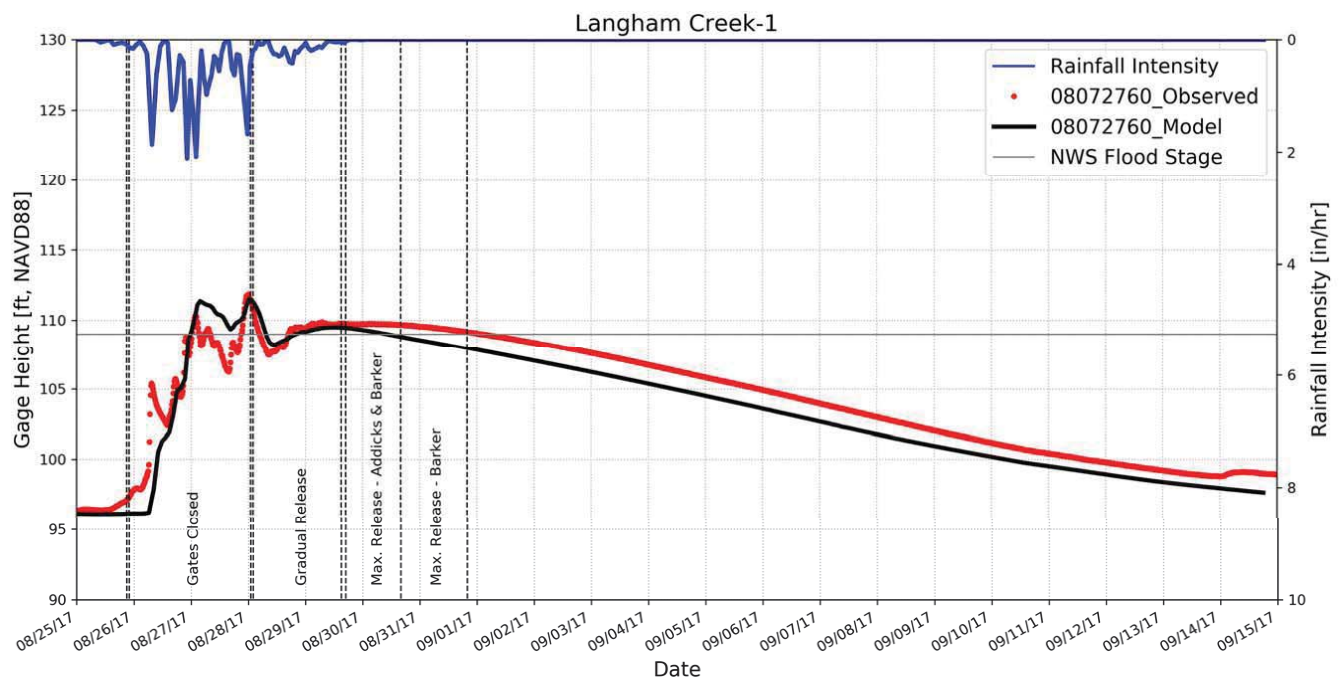


Figure 5-2: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072760 on upper Langham Creek.

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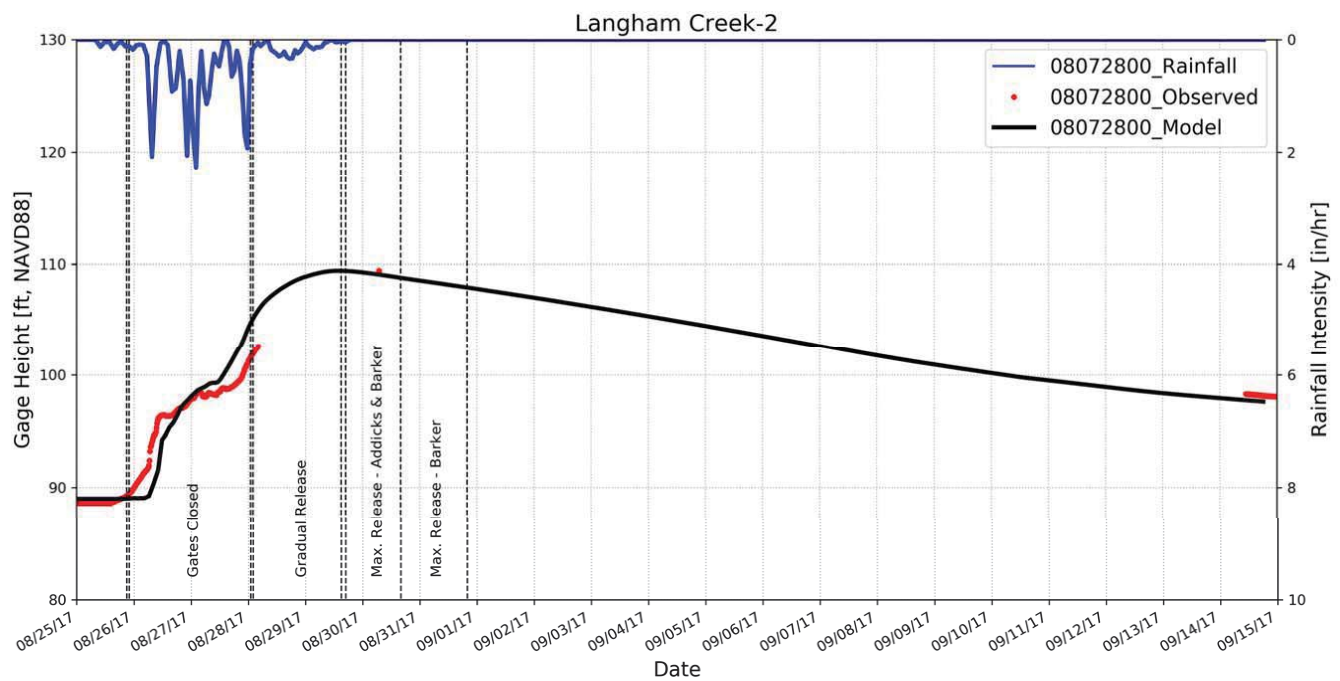


Figure 5-3: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072800 on upper Langham Creek.

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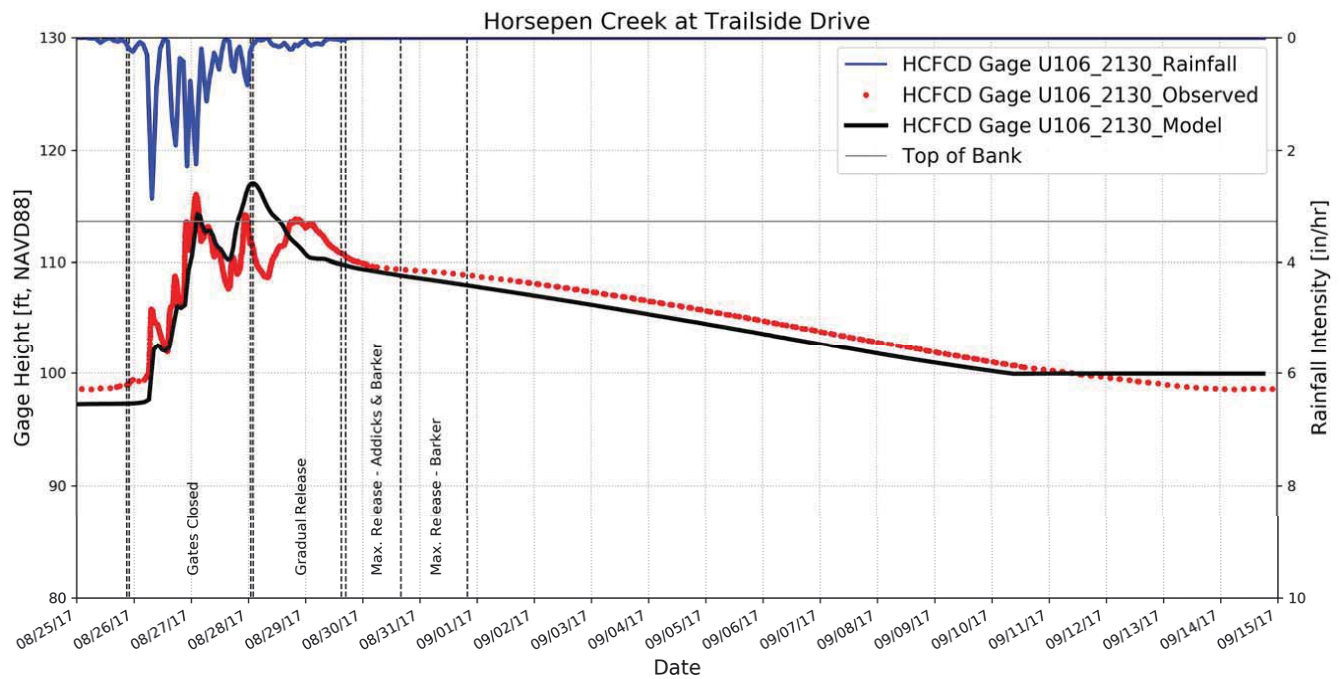


Figure 5-4: Simulated (Actual Harvey Run) and measured WSE at HCFCF Gage U106_2130 on Horsepen Creek.

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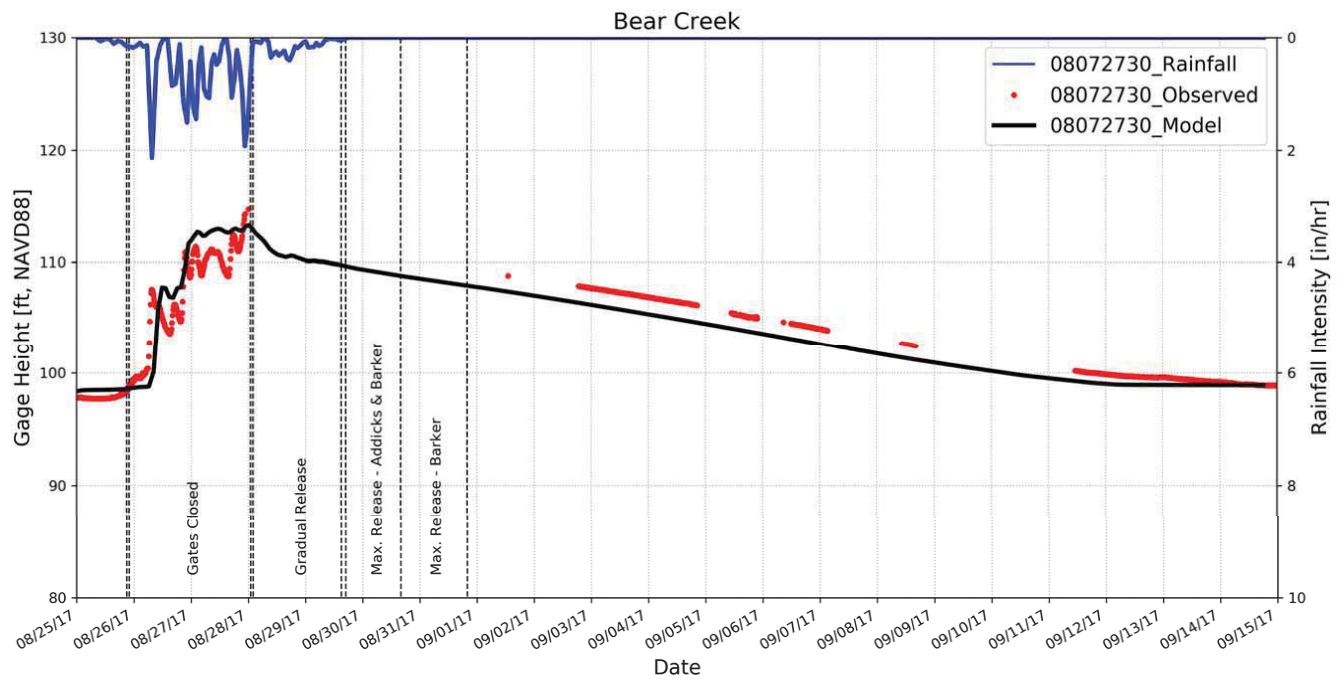


Figure 5-5: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072730 on Bear Creek.

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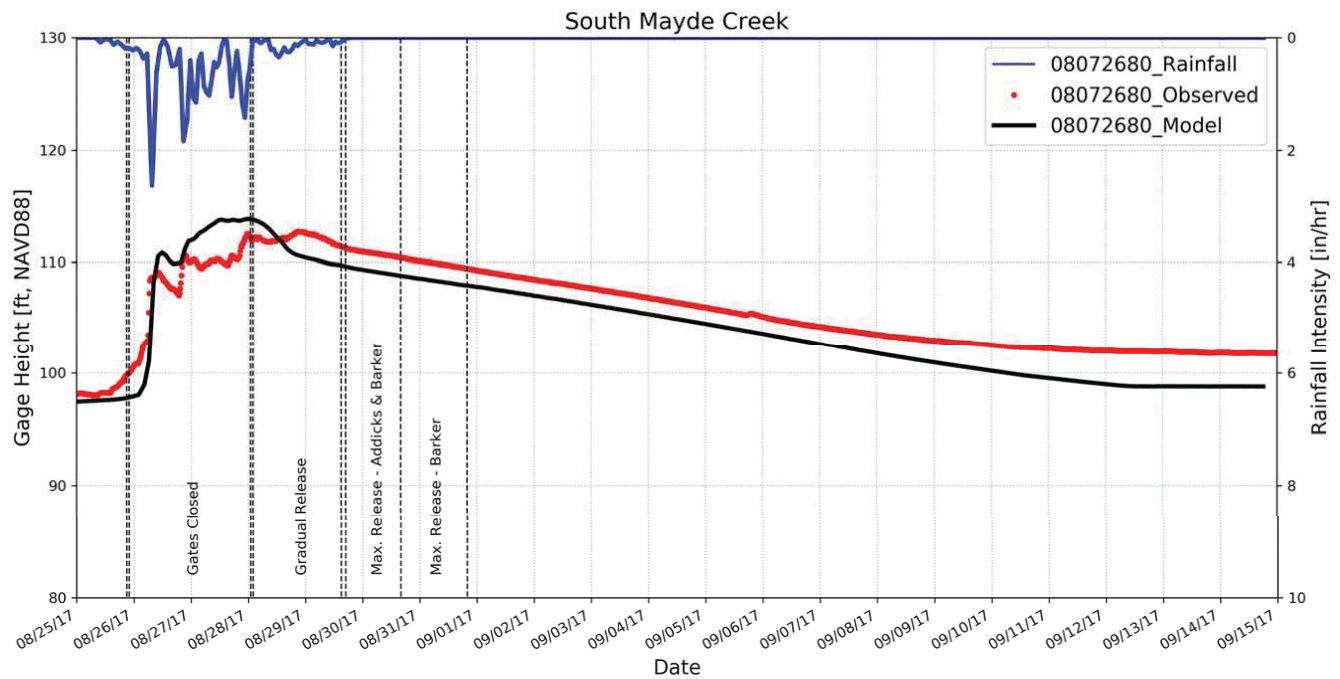


Figure 5-6: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072680 on South Mayde Creek.

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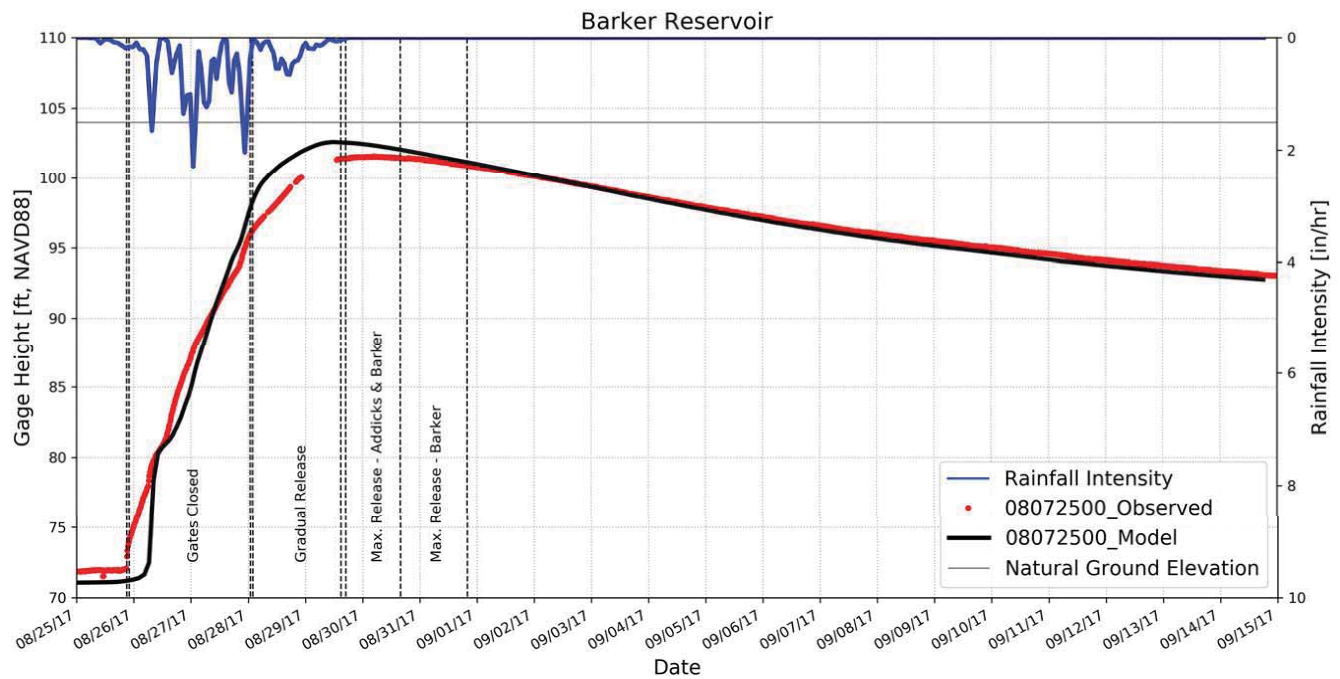


Figure 5-7: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072500 upstream of Barker gates (Barker reservoir pool elevations).

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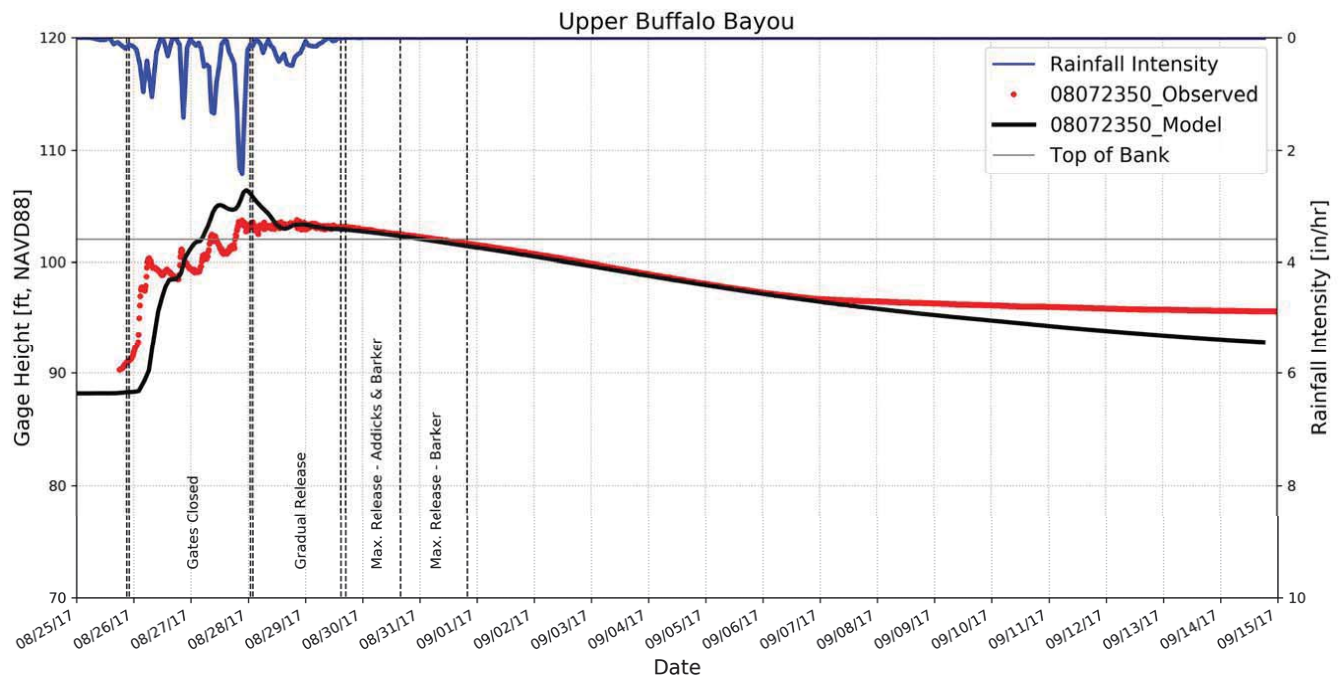


Figure 5-8: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072350 on upper Buffalo Bayou.

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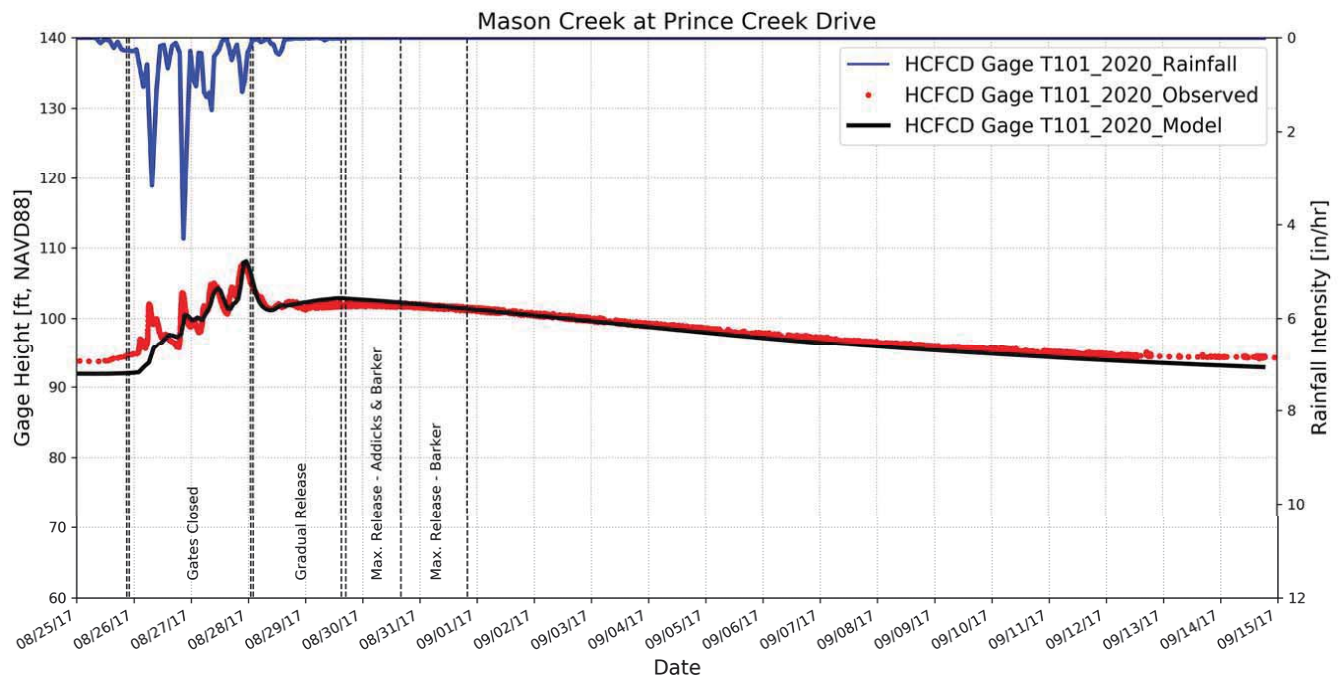


Figure 5-9: Simulated (Actual Harvey Run) and measured WSE at HCFCF Gage T101_2020 on Mason Creek.

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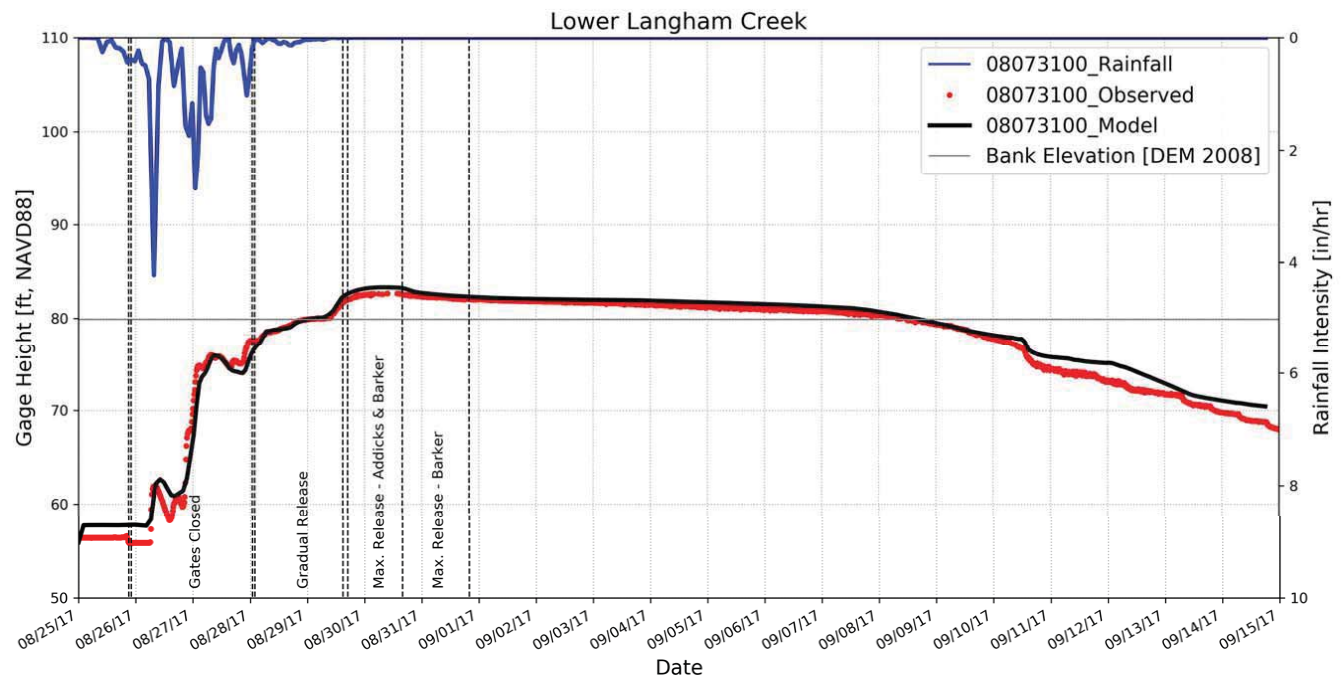


Figure 5-10: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08073100 on Lower Langham Creek.

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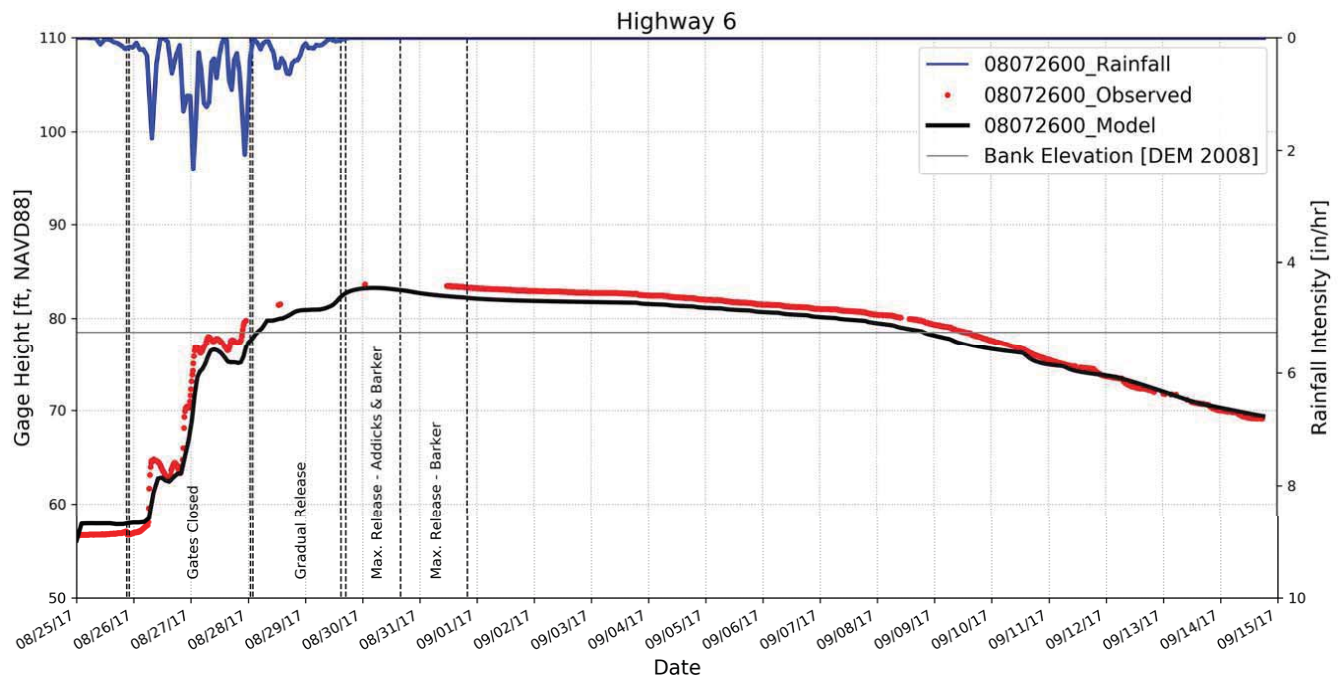


Figure 5-11: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08072600 on lower Buffalo Bayou at Highway 6.

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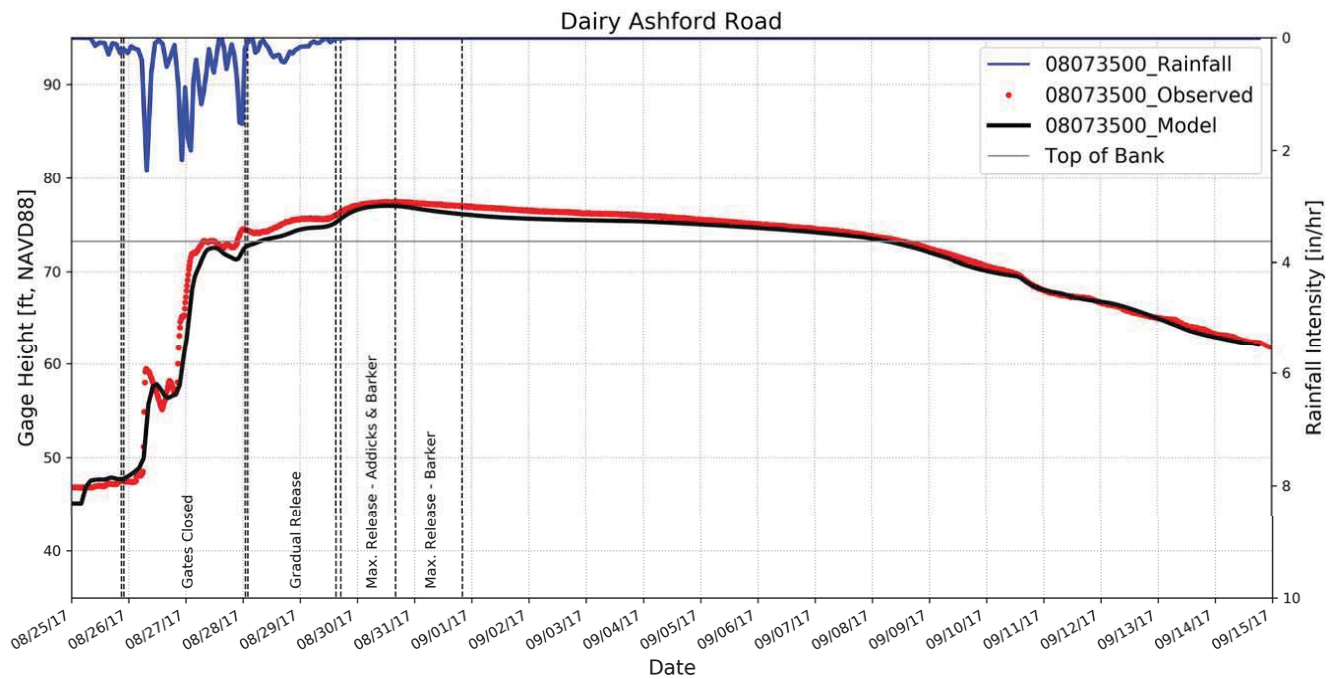


Figure 5-12: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08073500 on lower Buffalo Bayou at Dairy Ashford Road

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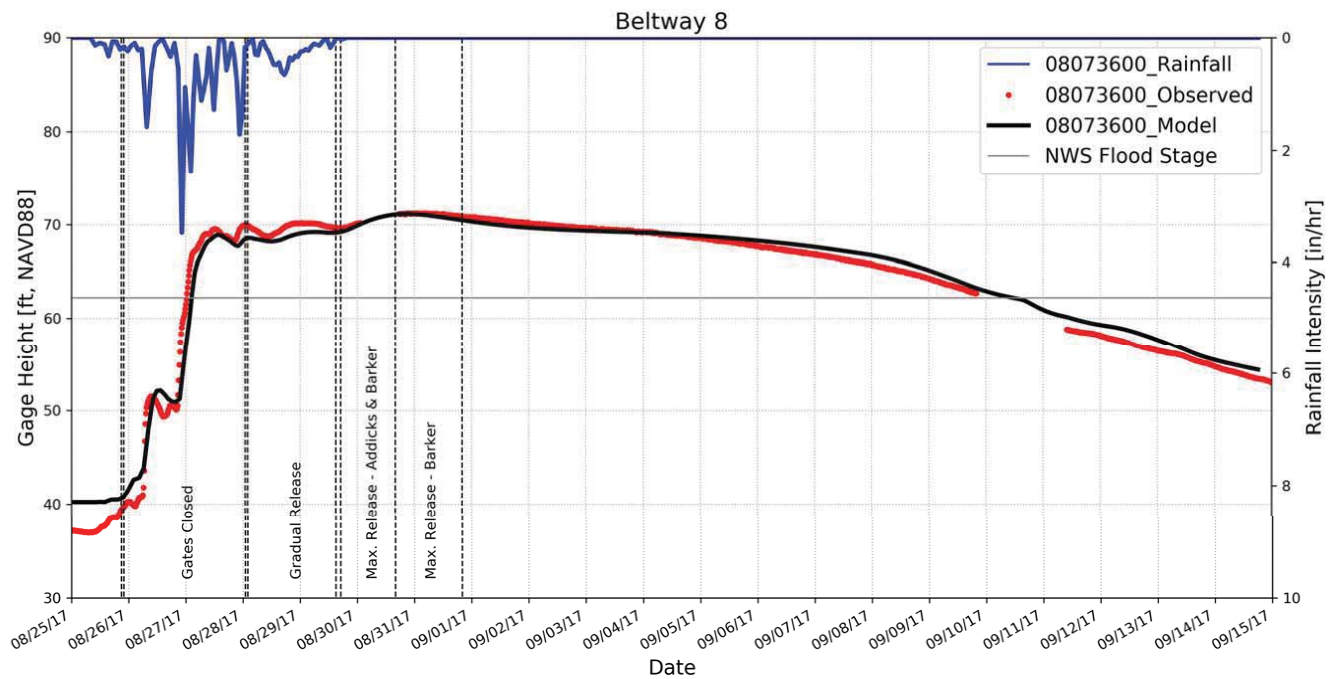


Figure 5-13: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08073600 on lower Buffalo Bayou at Beltway 8.

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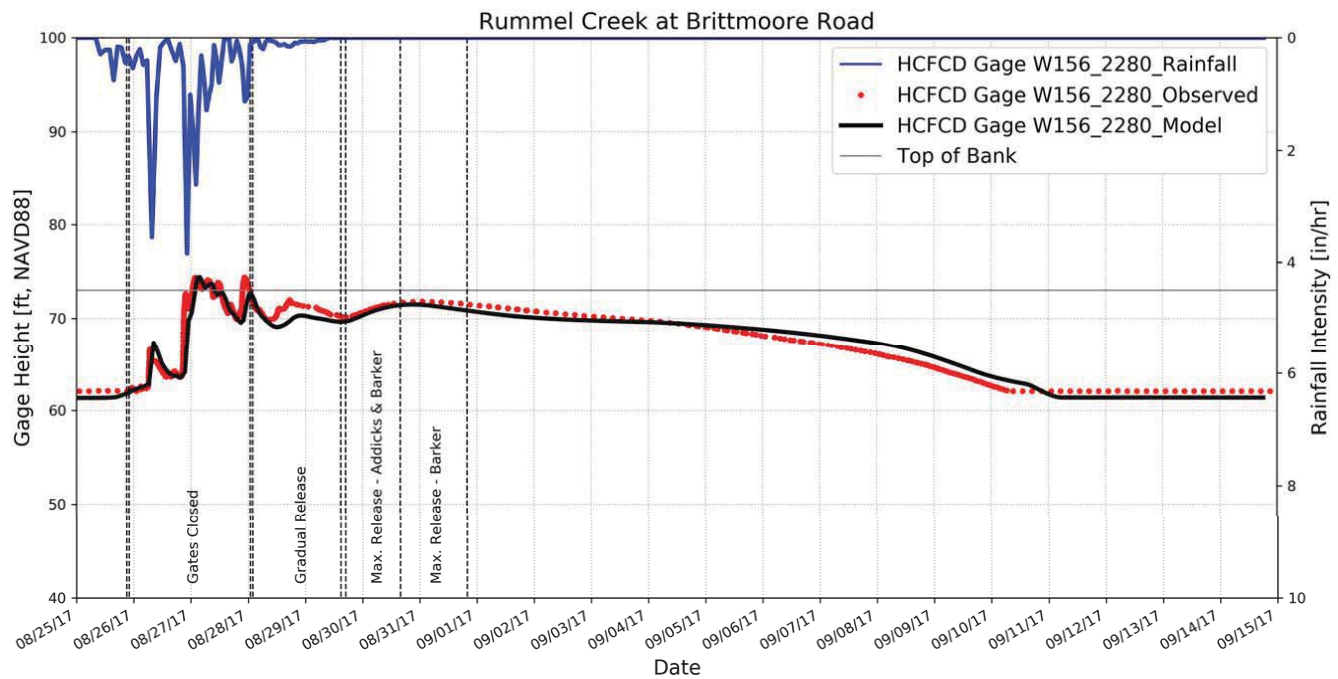


Figure 5-14: Simulated (Actual Harvey Run) and measured WSE at HCFCD Gage W156_2280 on Rummel Creek.

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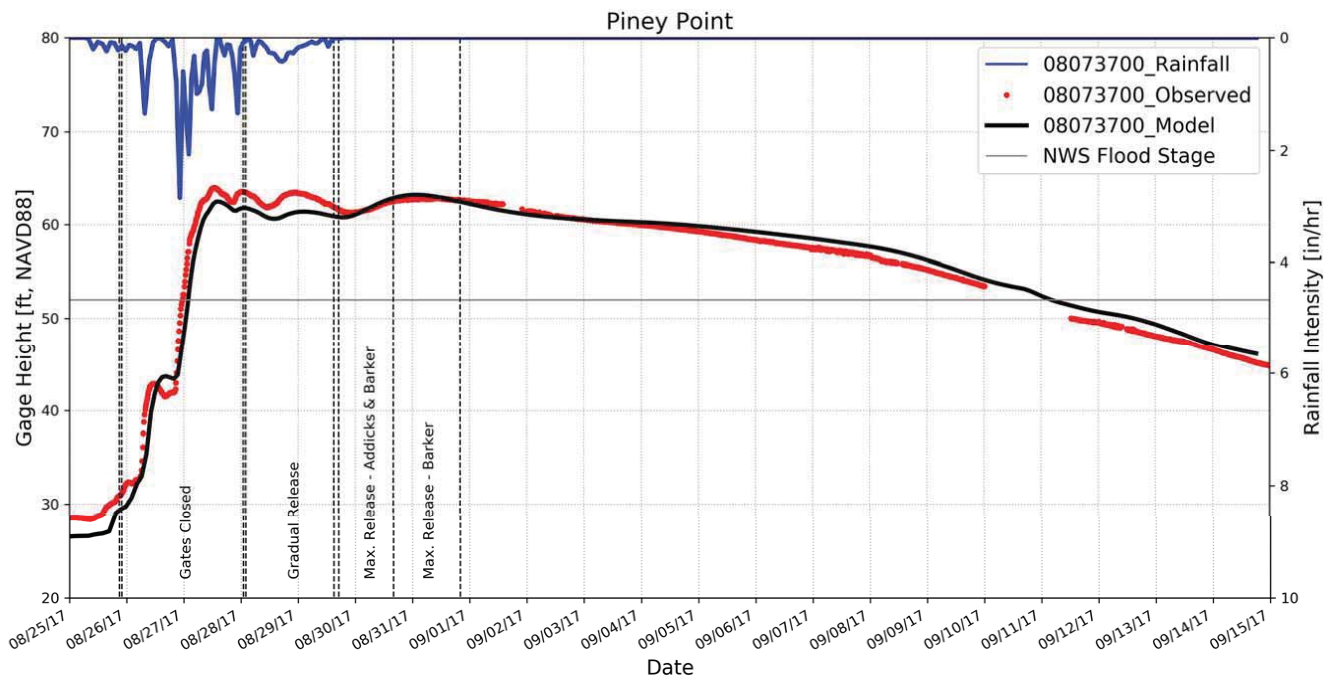


Figure 5-15: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08073700 on lower Buffalo Bayou at S Piney Point Road

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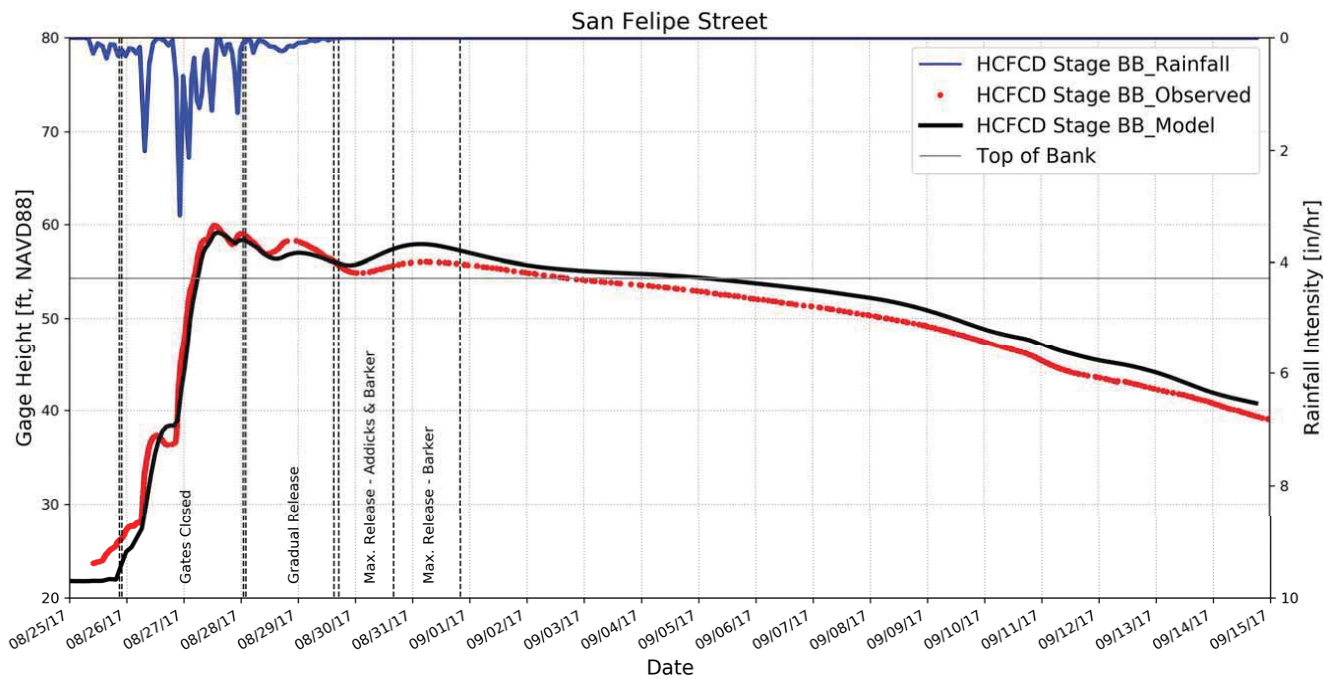


Figure 5-16: Simulated (Actual Harvey Run) and measured WSE at HCFCD Gage W100_2260 on lower Buffalo Bayou at San Felipe St.

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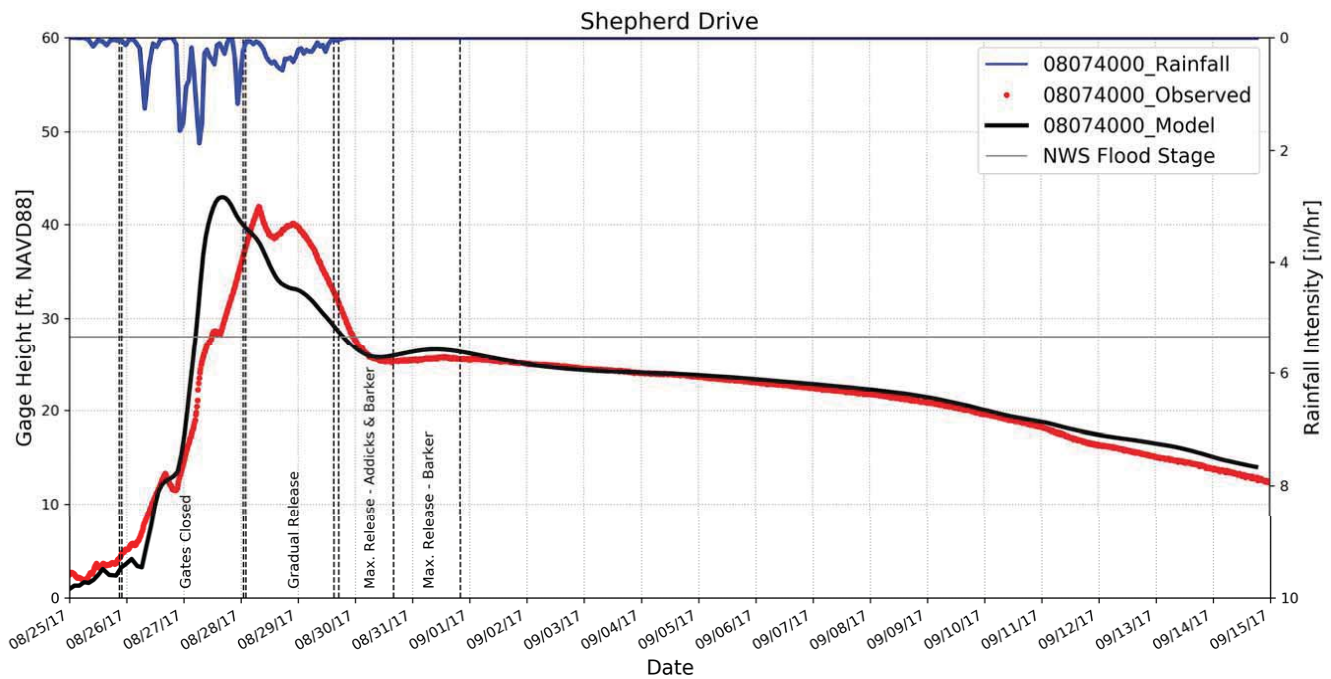


Figure 5-17: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08074000 on lower Buffalo Bayou at Shepherd Drive (gage measurements are unreliable before 8/28/2017).

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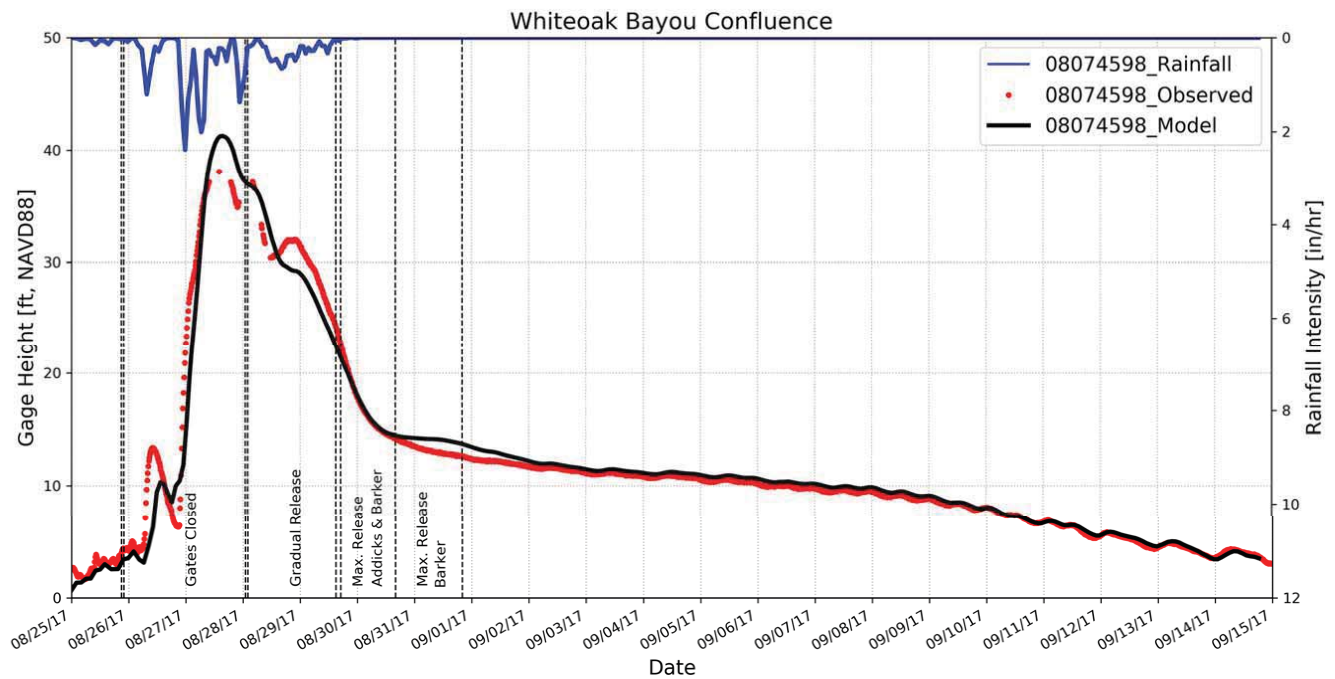


Figure 5-18: Simulated (Actual Harvey Run) and measured WSE at USGS Gage 08074598 on White Oaks Bayou at the confluence with lower Buffalo Bayou (gage is located outside the Focus Area).

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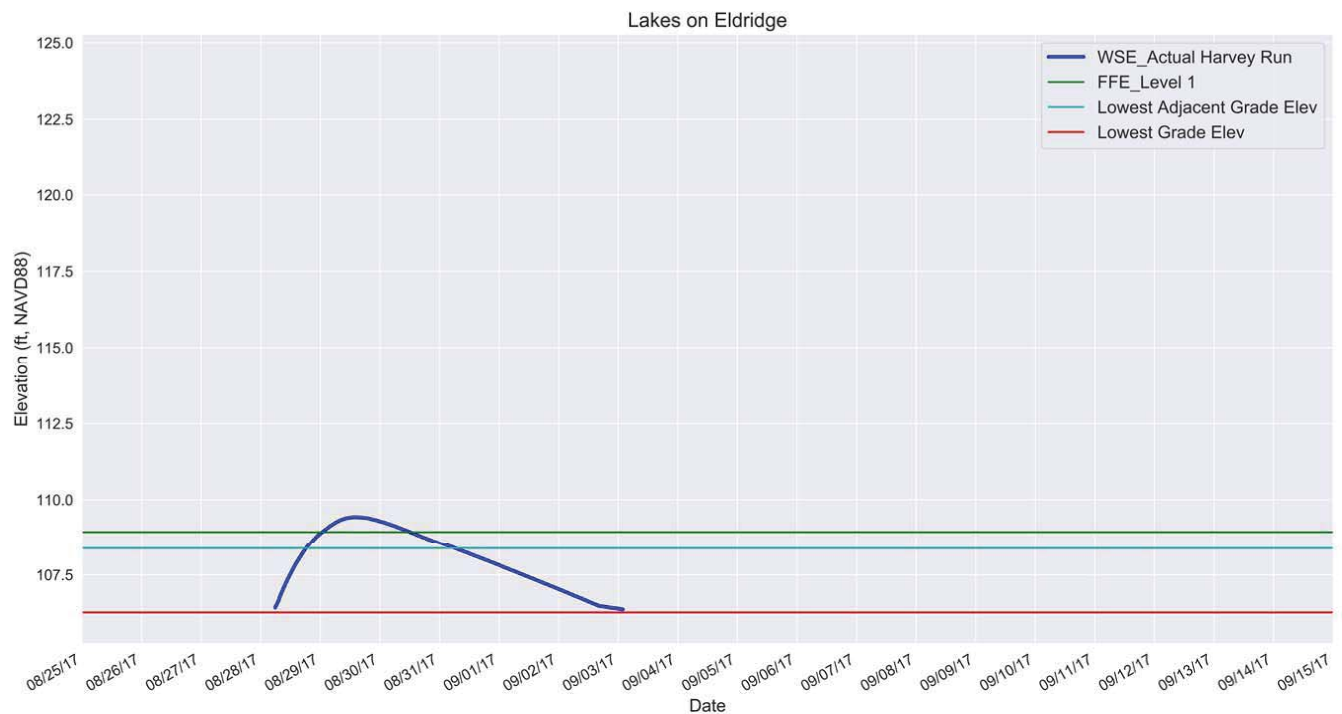


Figure 5-19: Simulated water surface elevations at Lakes on Eldridge (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
109.4	N/A	5.9"	3" - 4"

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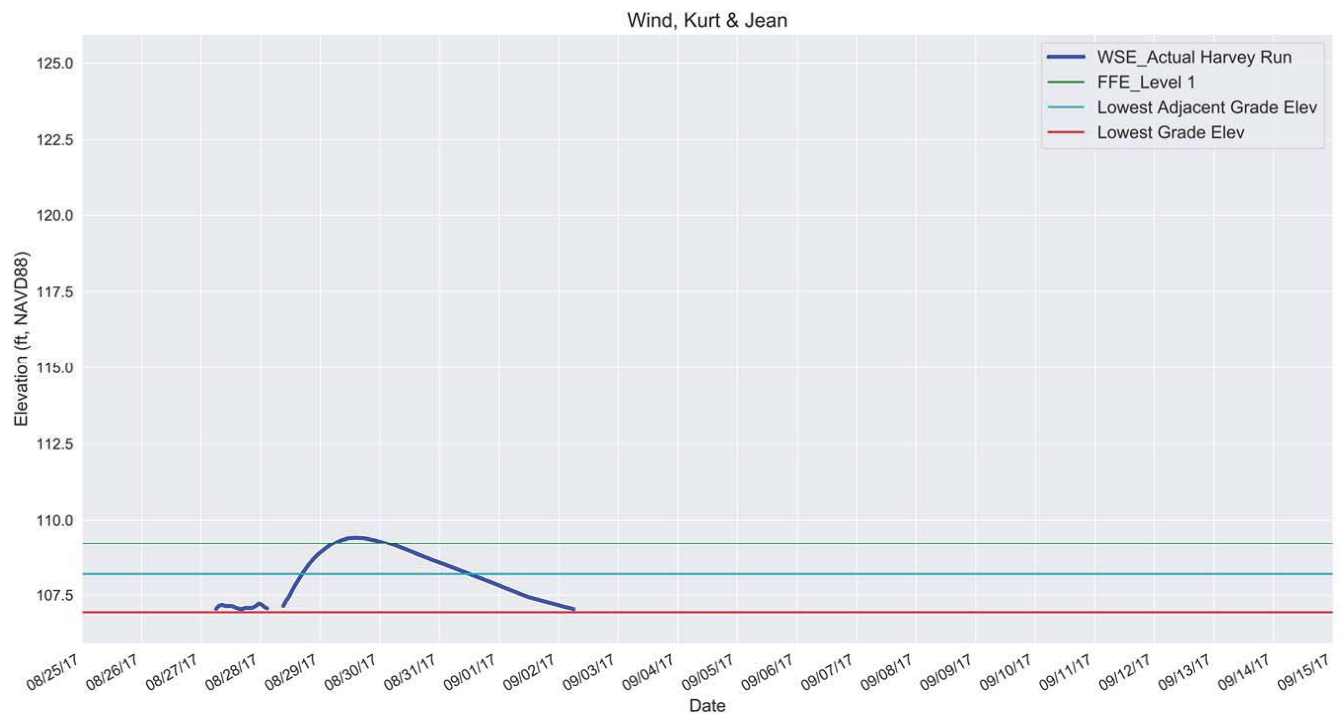


Figure 5-20: Simulated water surface elevations at the property of Wind, Kurt & Jean (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
109.4	N/A	2.7"	4" - 6" in house and 1 ft in garage

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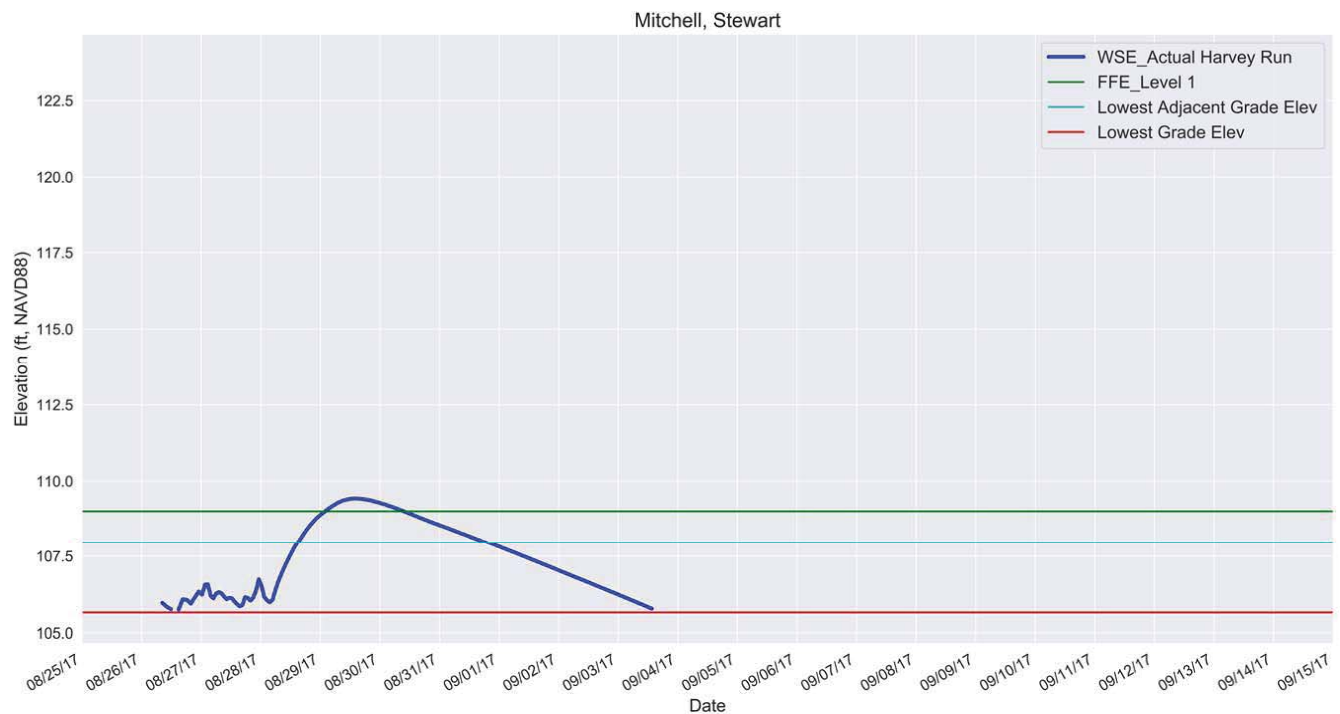


Figure 5-21: Simulated water surface elevations at the property of Mitchell, Stewart (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
109.4	109.7	5"	6"

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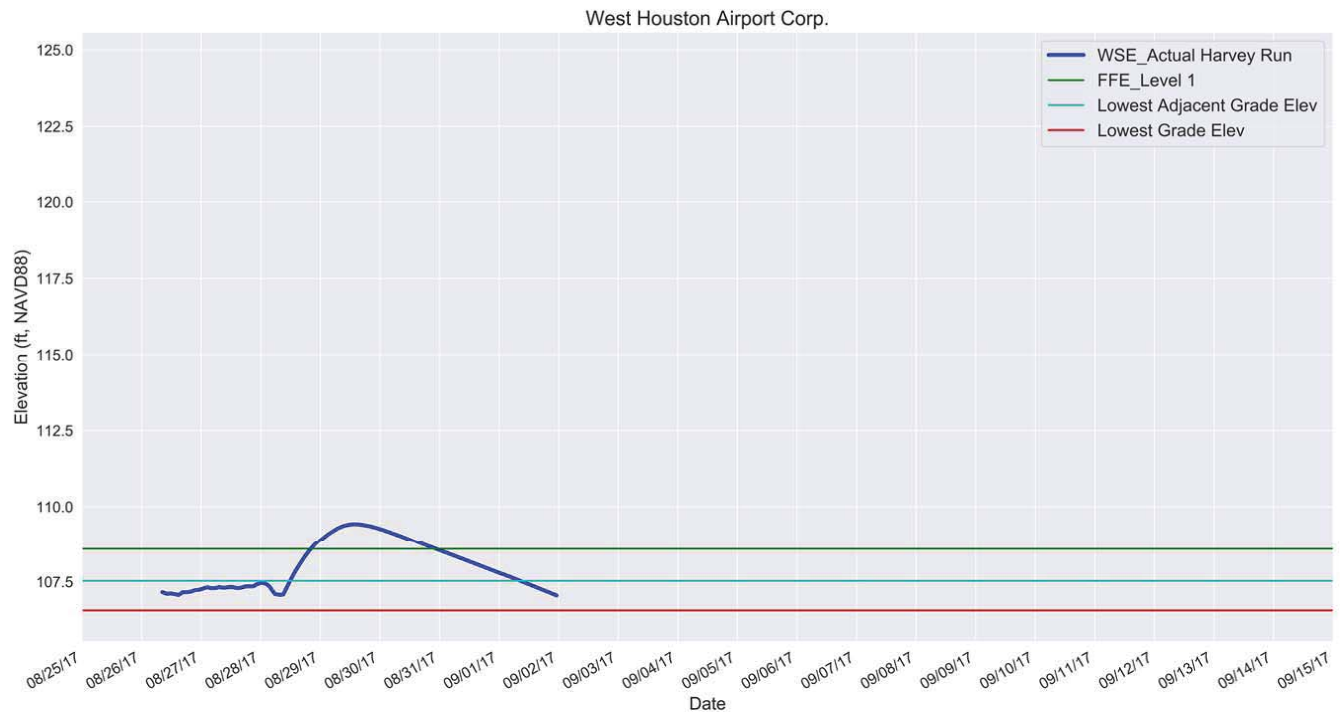


Figure 5-22: Simulated water surface elevations at West Houston Airport Corp. (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
109.4	109.7 / 109.8	10.1"	5" - 8"

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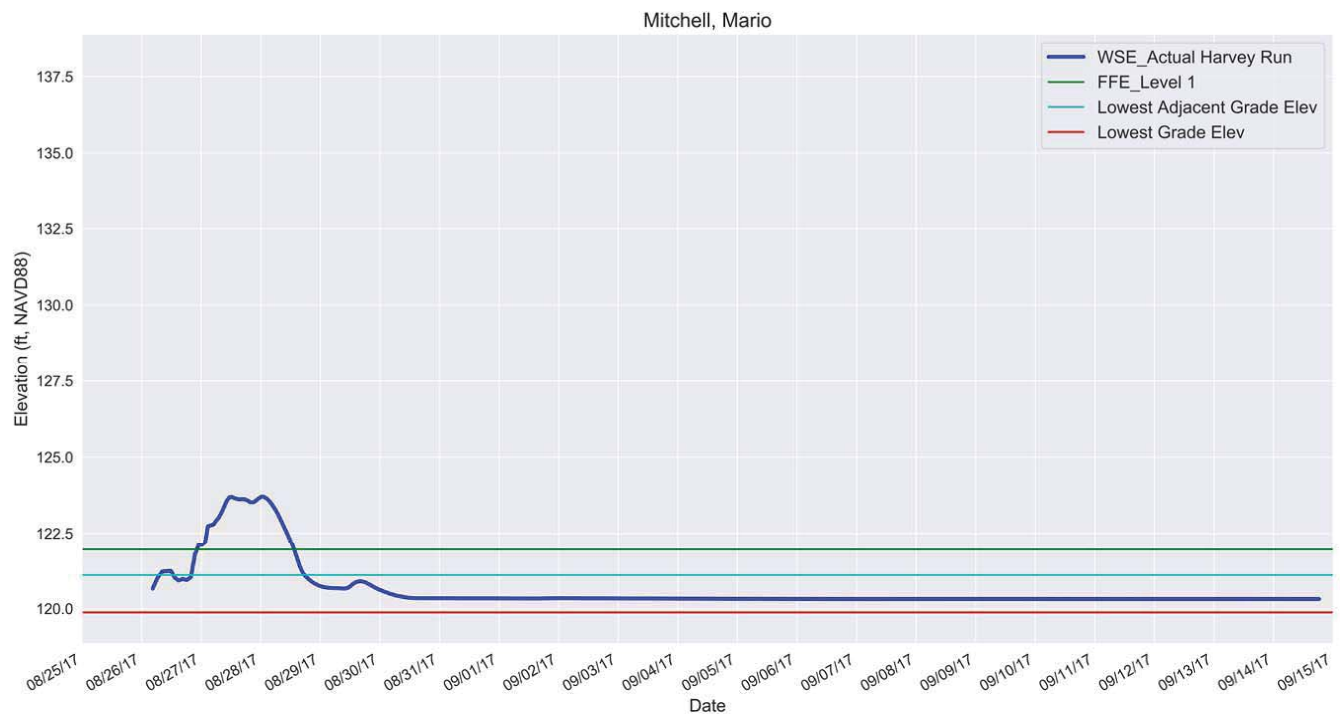


Figure 5-23: Simulated water surface elevations at the property of Mitchell, Mario (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
123.7	N/A	21.3"	No longer a Test Plaintiff

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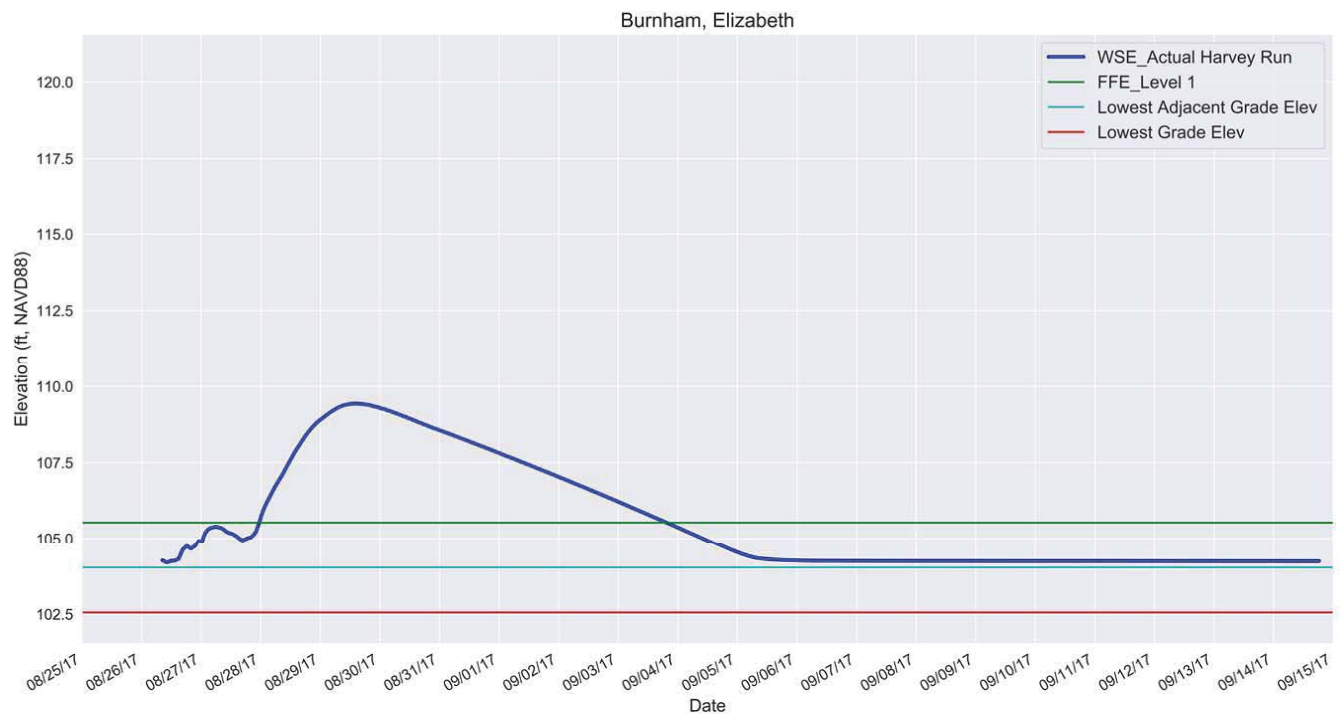


Figure 5-24: Simulated water surface elevations at the property of Burnham, Elizabeth (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
109.4	109.9 / 111.8	3.9 ft	Unsure because Plaintiff had evacuated.

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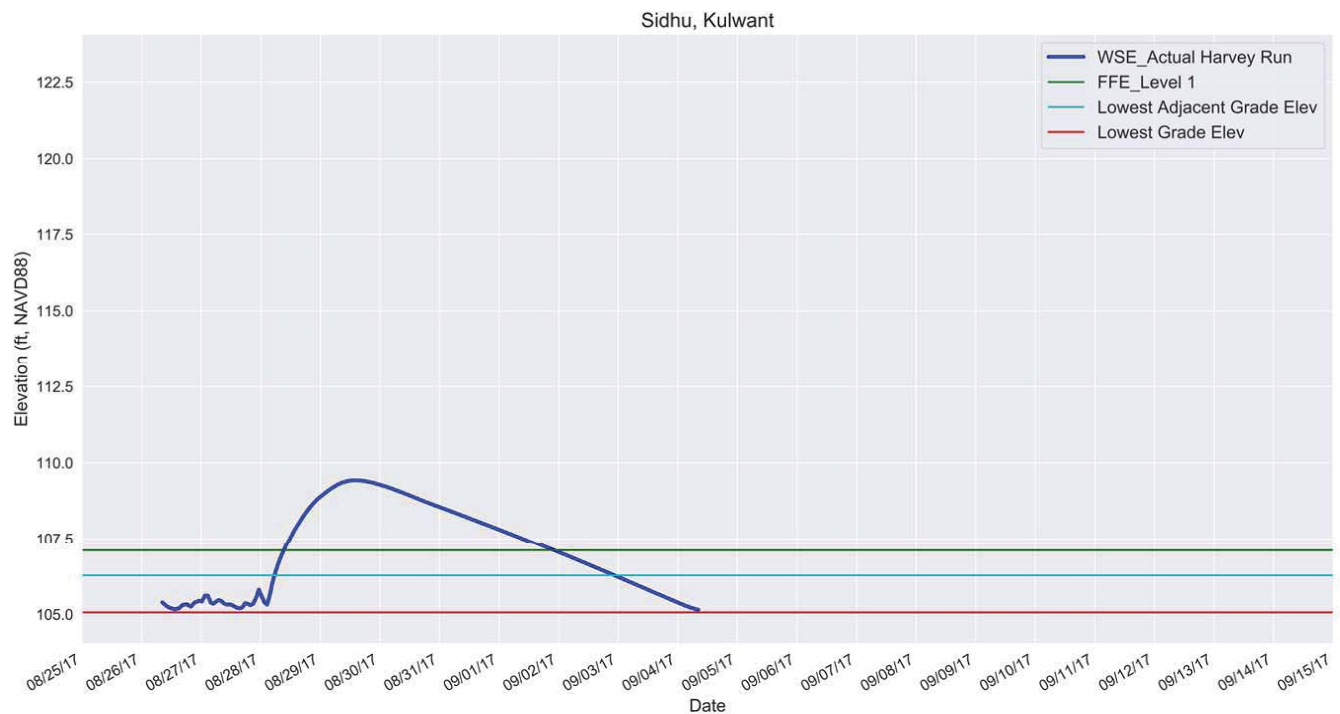


Figure 5-25: Simulated water surface elevations at the property of Sidhu, Kulwant (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
109.4	N/A	2.3 ft	3 ft

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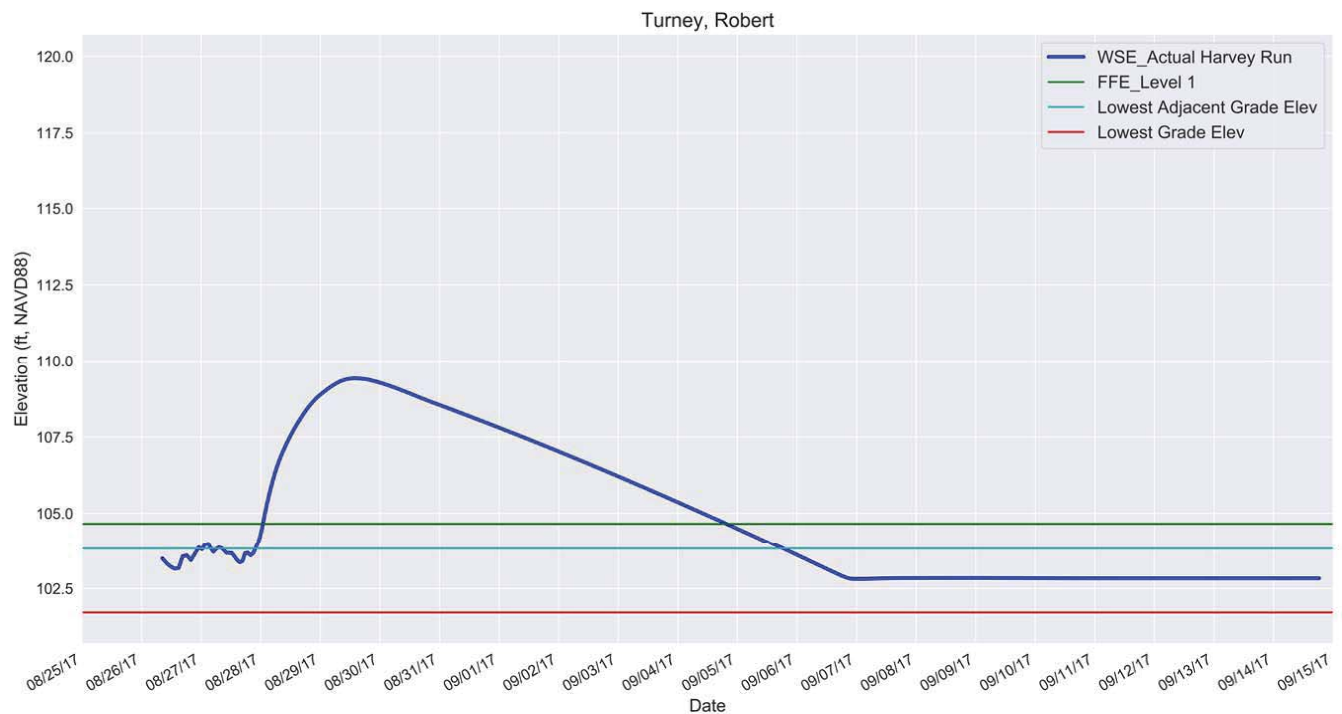


Figure 5-26: Simulated water surface elevations at the property of Turney, Robert (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
109.4	109.4	4.8 ft	5 ft

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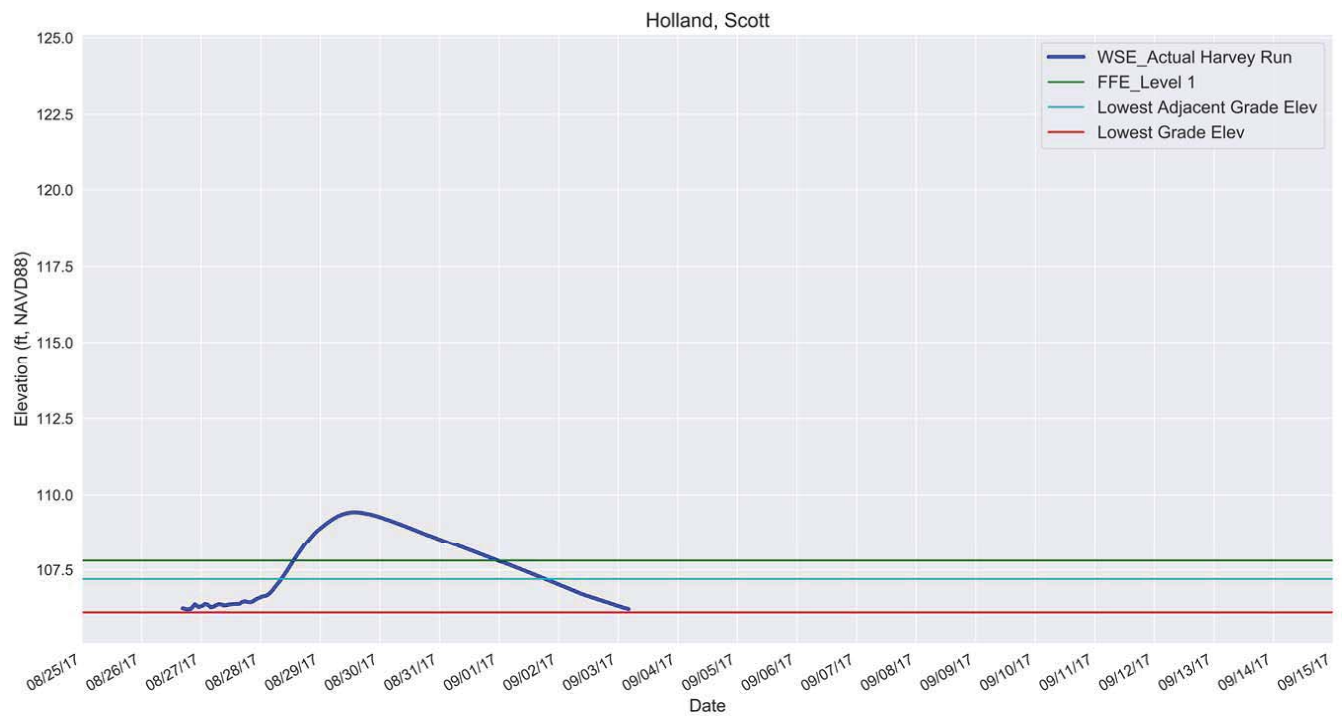


Figure 5-27: Simulated water surface elevations at the property of Holland, Scott (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
109.4	109.3 / 110.2	1.6 ft	3 - 4 ft. There was 2 ft when evacuated on 8/28/2017

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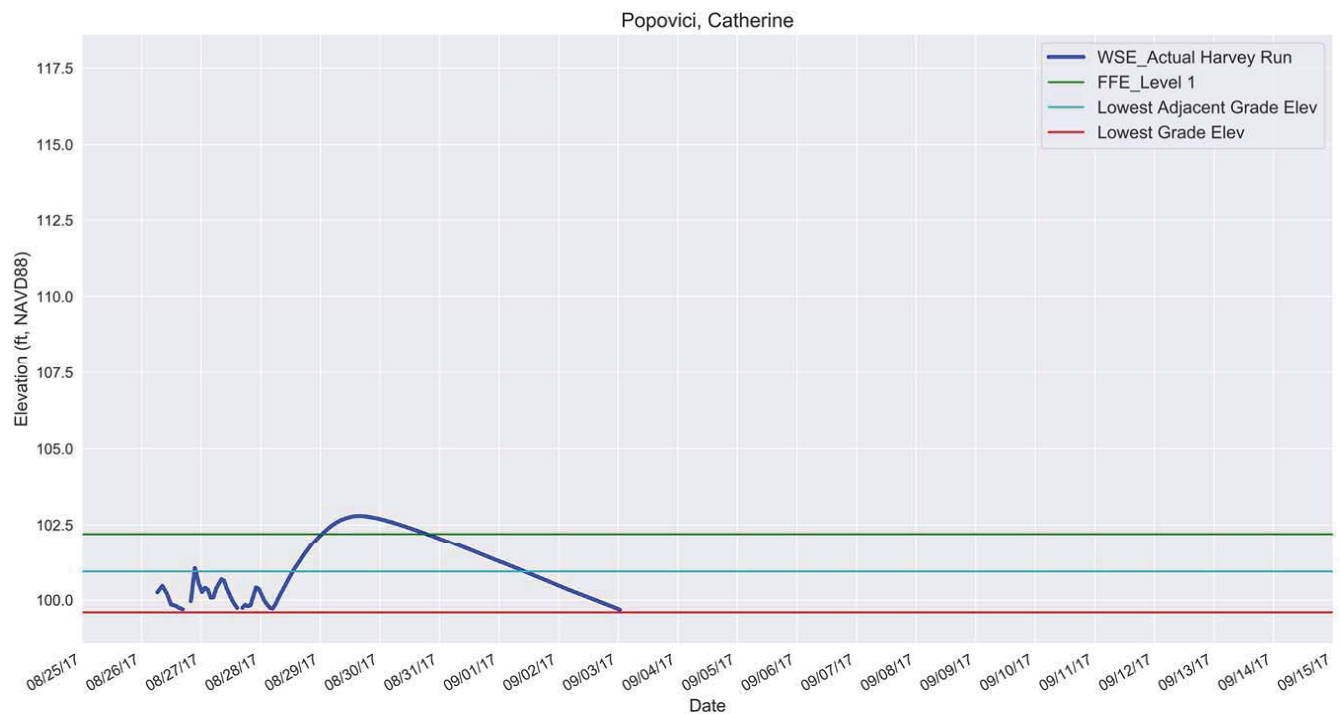


Figure 5-28: Simulated water surface elevations at the property of Popovici, Catherine (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
102.8	N/A	7.2"	4" outside house. No flooding in house.

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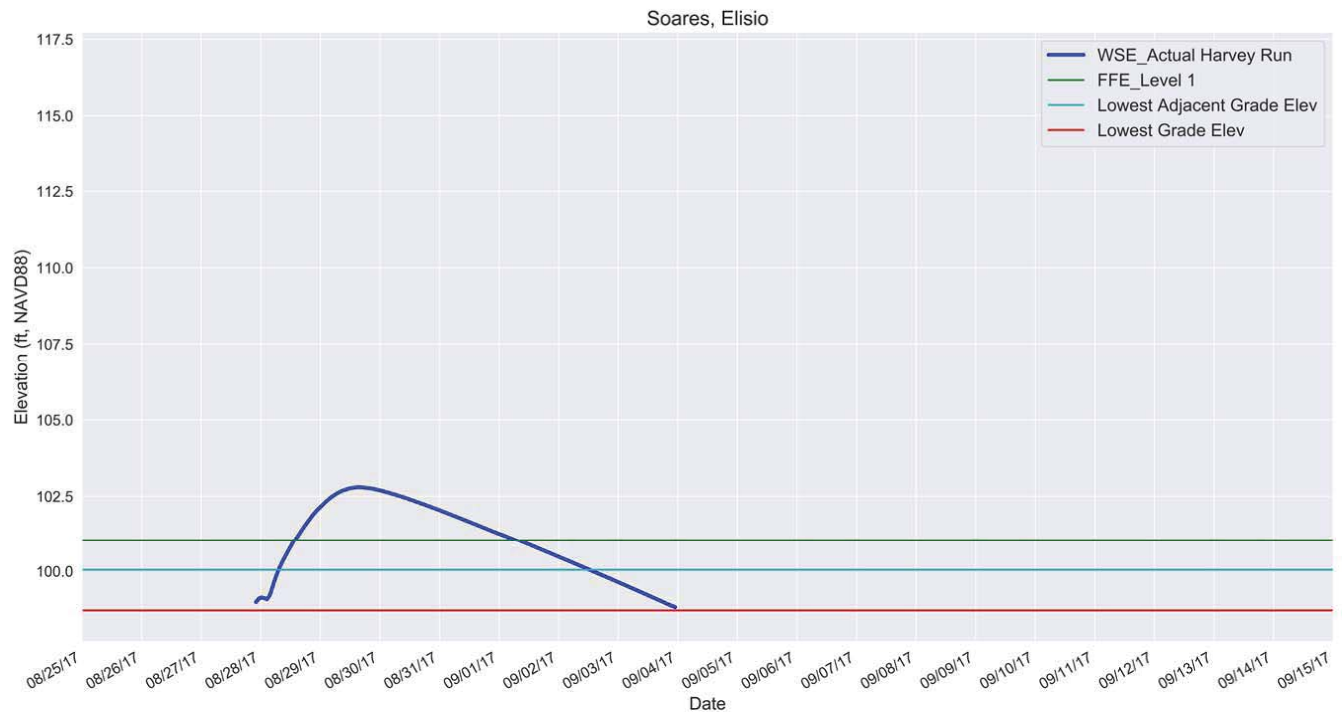


Figure 5-29: Simulated water surface elevations at the property of Soares, Elisio (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
102.8	N/A	20.9"	8" - 36"

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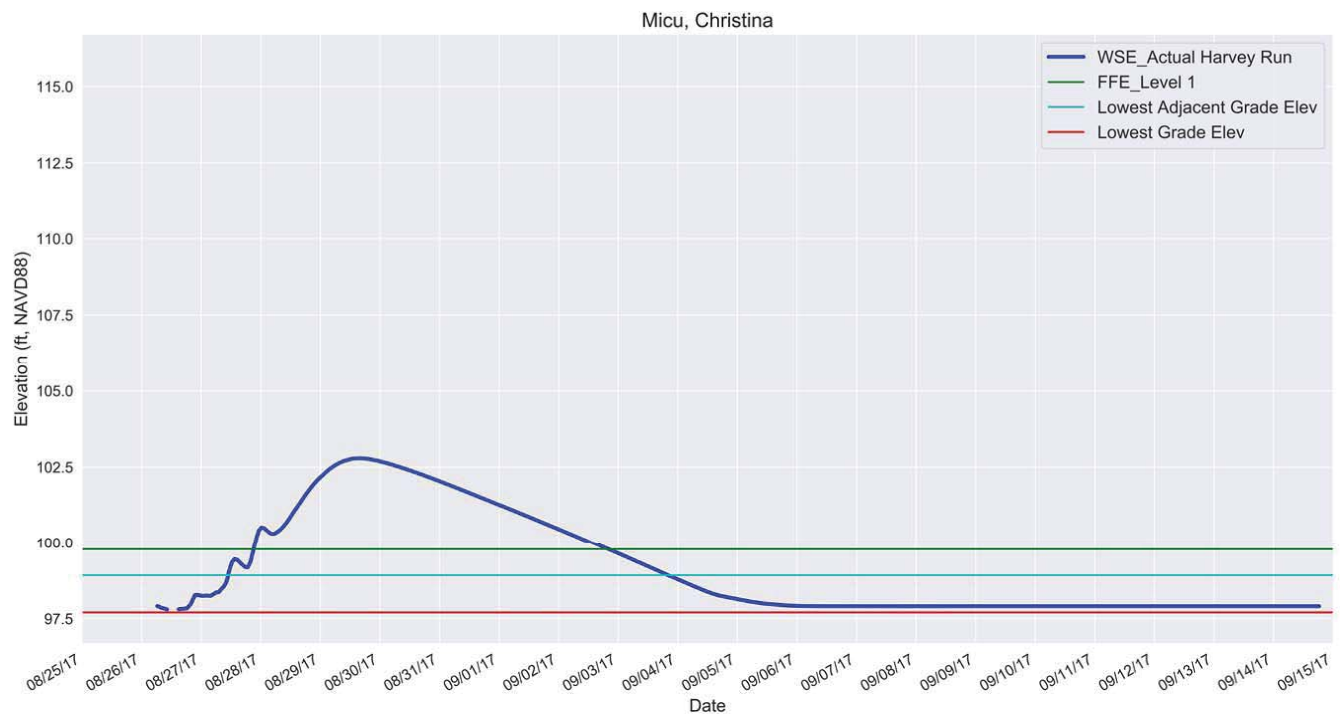


Figure 5-30: Simulated water surface elevations at the property of Micu, Christina (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
102.8	101.6 / 101.1	36"	21" inside and 31" outside

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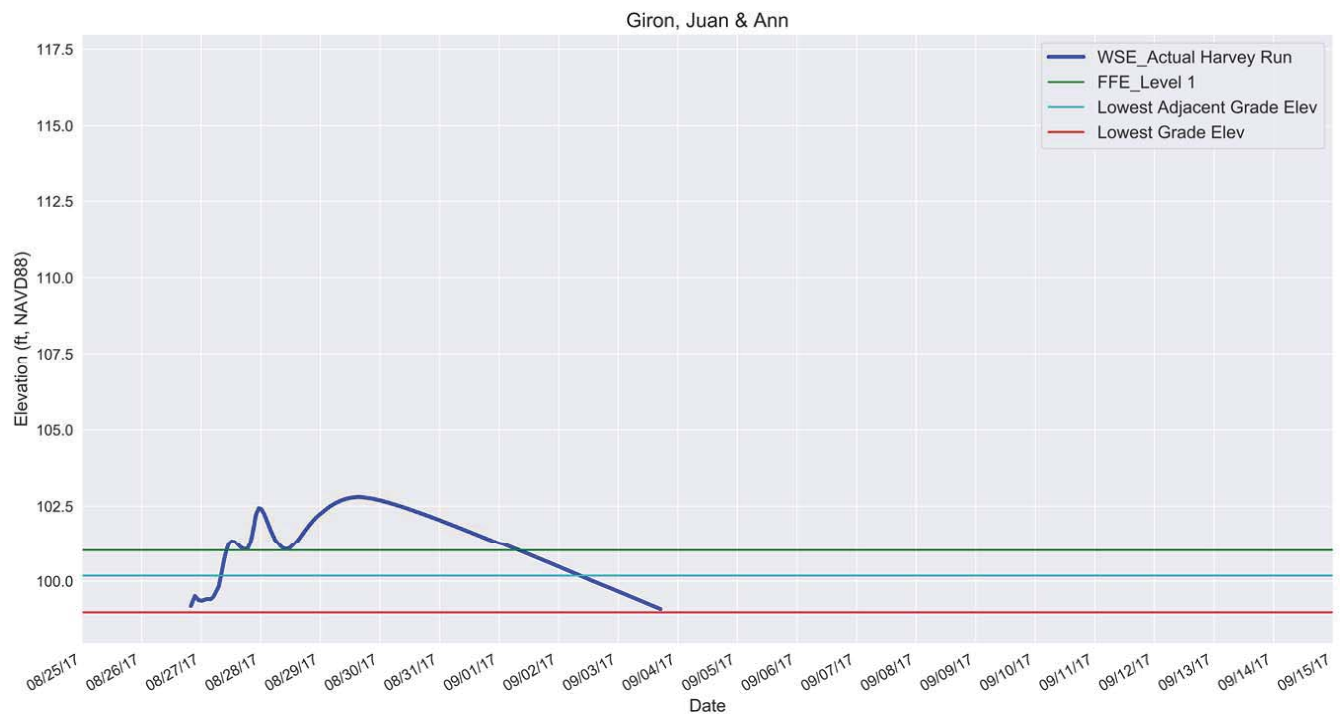


Figure 5-31: Simulated water surface elevations at the property of Giron, Juan & Ann (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
102.8	N/A	21.5"	6" - 10" or more

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Figure 5-32: Simulated water surface elevations at the property of Banker, Todd & Christina (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed HWM Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
102.8	102.1	25"	12" - 14"

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5.2.2 No Project Run

The No Project Run simulates the Harvey Event under the assumption that the federal project on Government Owned Land is not in place. To prepare the topography for this run, the following changes to the Actual Harvey Run topography were made:

- Addicks and Barker dams were removed
- Borrow areas⁴⁰ inside the reservoirs were filled to natural elevations
- Channels on GOL were filled to natural elevations within the GOL
- The rectified sections of lower Buffalo Bayou and lower Langham Creek below the dams were filled to natural elevations.
- The 1940s era un-rectified conditions for lower Buffalo Bayou and lower Langham Creek were re-introduced.
- Upper tributaries were connected to lower tributaries representing conditions prior to the construction of the dams and reservoirs.

Roughness and hydrologic loss parameters (derived from land use) were copied from the Actual Harvey Run. Table 5.3 and Table 5.4 present summaries of the No Project Run results extracted at upstream and downstream Test Plaintiffs, respectively. Figure 5-33 to Figure 5-46 show simulated free water surface elevations at the upstream Test Properties comparing the No Project Run and the Actual Harvey Run. These figures provide a measure of the benefit of the federal project⁴¹ on flood levels. Downstream of the dams (Figure 5-47 to Figure 5-60), the increase in simulated water surface elevations for the No Project Run (compared to the Actual Harvey Run) at downstream Test Properties is as high as 8.6 ft. In addition, water depth above first finished floor elevations downstream of the dams reached more than 10 to 15 ft under the No Project Run, which is substantially higher than depths experienced during the Harvey Event. These results show that the federal project has distributed the flooding across the upstream and downstream areas to achieve less severe conditions reducing risk to life and property. Downstream of the dams, the federal project (particularly the Addicks and Barker dams) have distributed the amount of floodwater produced over the few-days duration of the Harvey Event over a much longer period (few weeks), which has effectively and significantly reduced the depth of floodwaters downstream of the dams.

A tabular comparison of the Actual Harvey Run and the No Project Run is presented in later in Table 5.7.

⁴⁰ Borrow areas are those where material are dug for use at another location.

⁴¹ Including the Addicks and Barker dam project, the lower Buffalo Bayou rectification project and all other federal-approved channel improvements.

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Table 5.3: Summary of the No Project Run Results at Upstream Test Plaintiffs.

Plaintiff	Elevations (ft, NAVD88)					Max Depth above First Finished Floor (ft)	Flooding duration in First Finished Floor
	Lowest Grade	Garage Elevation	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Mitchell, Mario	119.9	121.5	121.1	121.9	-	1.8	1 day, 15 hr
Burnham, Elizabeth	102.6	105.0	104.0	105.5	-	1.1	1 day, 7 hr
Micu, Christina	97.7	99.6	98.9	99.8	-	0.9	0 day, 18 hr
Giron, Juan & Ann	99.0	101.0	100.2	101.0	101.5	1.4	0 day, 21 hr
<i>Other Upstream Test Plaintiffs do not experience flooding under the No Project Run.</i>							

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Table 5.4: Summary of the No Project Run Results at Downstream Test Plaintiffs

Plaintiff	Elevations (ft, NAVD88)					Max Depth above First Finished Floor (ft)	Flooding duration above First Finished Floor
	Lowest Grade	Garage Elevation	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Aldred, Val & Linda	78.9	80.1	79.4	80.6	-	9.8	4 day, 9 hr
Good Resources, LLC	75.1	-	77.8	78.5	87.4	12.0	5 day, 6 hr
SMC Investment	72.4	78.2	73.5	77.2	77.3	13.5	6 day, 9 hr
Milton, Arnold	76.3	78.6	78.0	78.5	78.6	12.5	5 day, 19 hr
Shipos, Jennifer	78.2	80.5	80.2	80.9	-	9.4	4 day, 7 hr
Hollis, Wayne	74.5	76.7	75.2	76.6	-	11.5	5 day, 6 hr
Silverman, Peter	73.4	75.2	74.4	75.0	-	9.3	4 day, 19 hr
Godejord, Strause	68.5	73.5	72.8	73.7	-	10.0	4 day, 20 hr
Cutts, Paul	68.8	71.1	69.9	71.7	-	7.6	4 day, 3 hr
Ho, Becky	69.2*						
Beyoglu, Mahmut	63.6	64.8	63.8	65.4	-	10.8	4 day, 6 hr
Azar, Phillip	43.6	48.1	44.8	48.9	-	16.4	4 day, 20 hr
Stahl, Timothy	55.0	55.4	55.2	52.1	55.9	10.4	4 day, 9 hr
Welling, Shawn	36.1	46.8	37.3	36.0	47.4	15.4	5 day, 7 hr

* Not surveyed; based on DEM.

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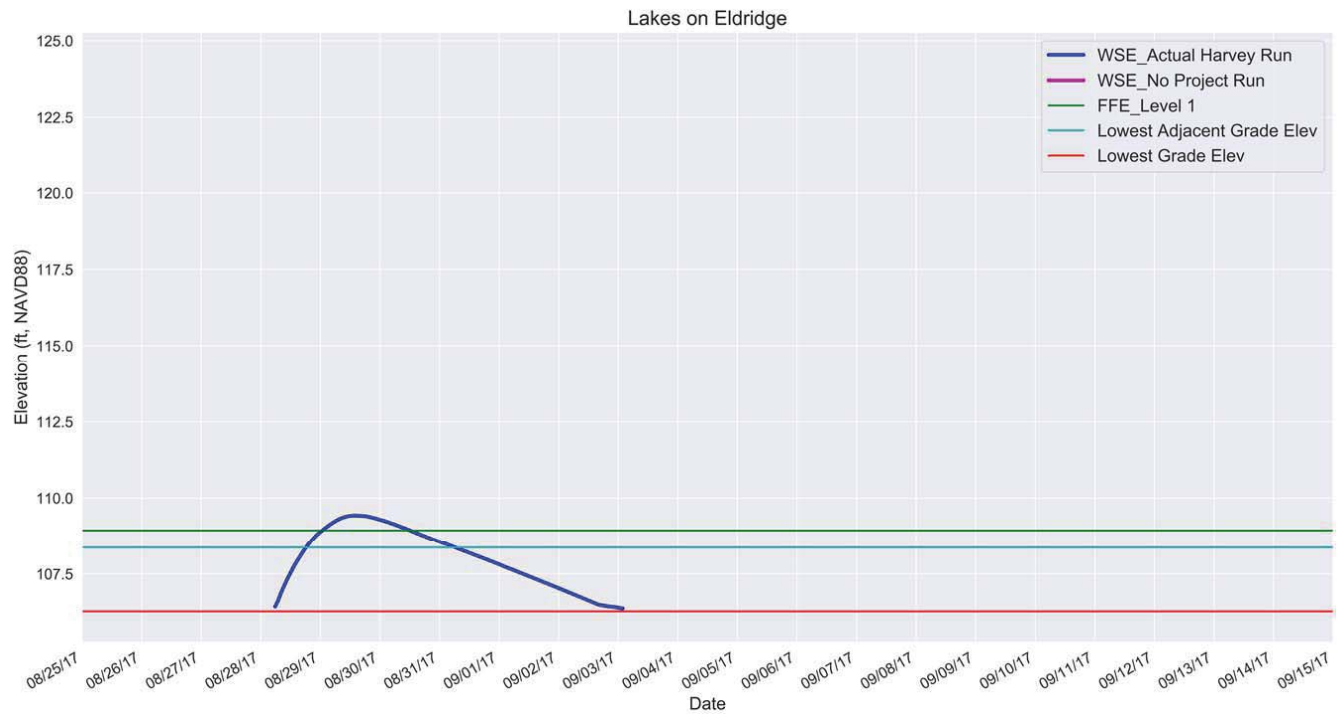


Figure 5-33: Simulated free water surface elevations at Lakes on Eldridge (Actual Harvey Run and No Project Run)

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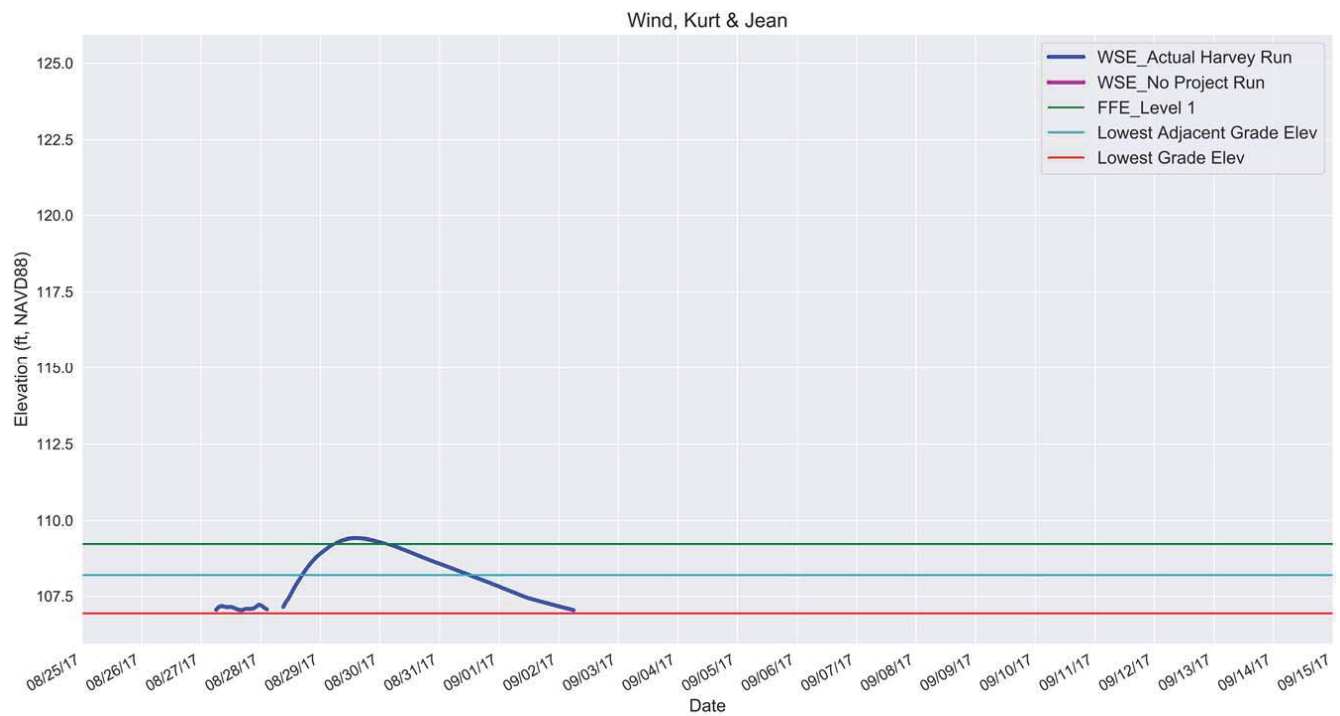


Figure 5-34: Simulated free water surface elevations at the property of Wind, Kurt & Jean (Actual Harvey Run and No Project Run)

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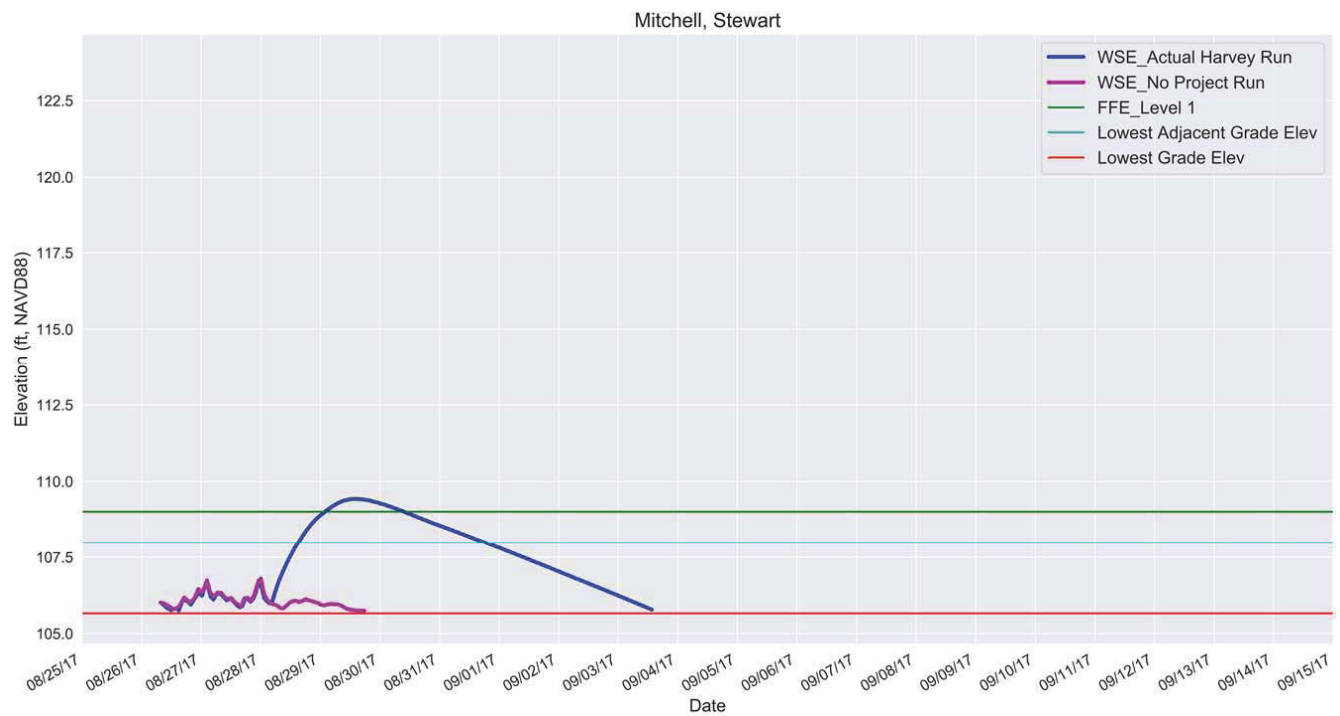


Figure 5-35: Simulated free water surface elevations at the property of Mitchell, Stewart (Actual Harvey Run and No Project Run)

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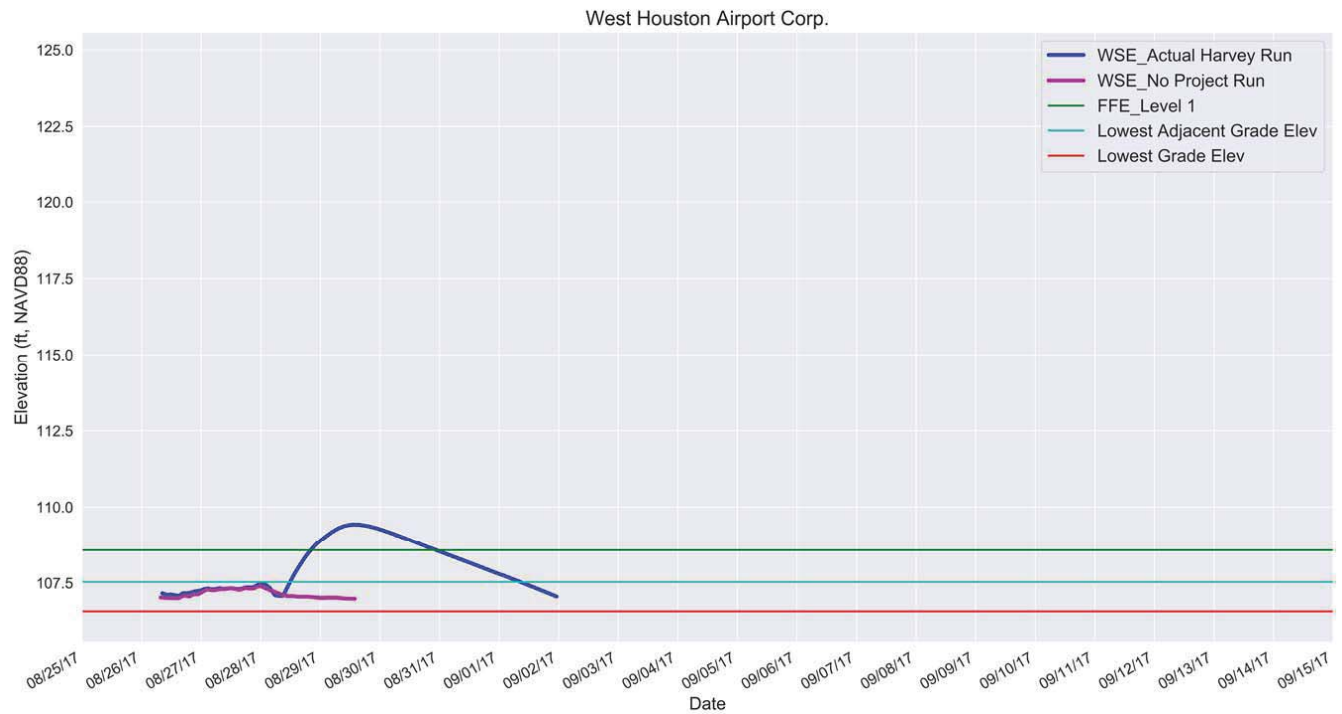


Figure 5-36: Simulated free water surface elevations at West Houston Airport Corp. (Actual Harvey Run and No Project Run)

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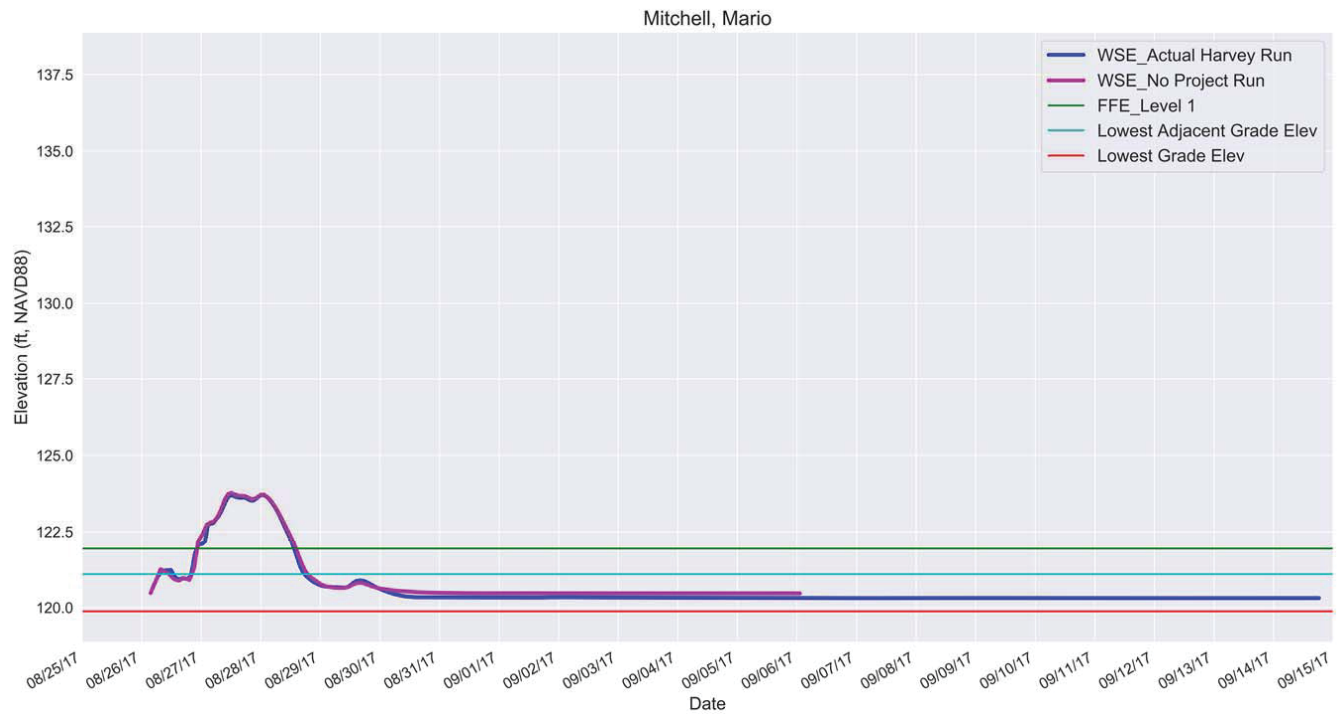


Figure 5-37: Simulated free water surface elevations at the property of Mitchell, Mario (Actual Harvey Run and No Project Run)

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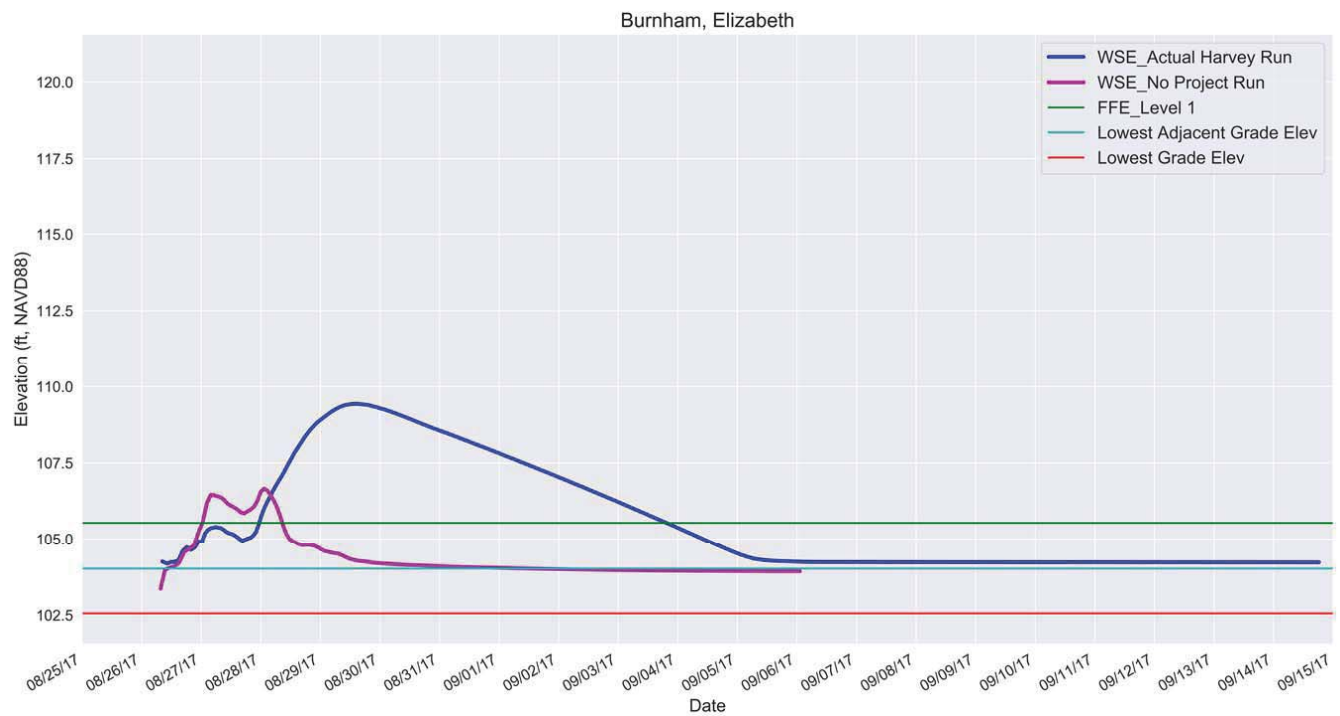


Figure 5-38: Simulated free water surface elevations at the property of Burnham, Elizabeth (Actual Harvey Run and No Project Run)

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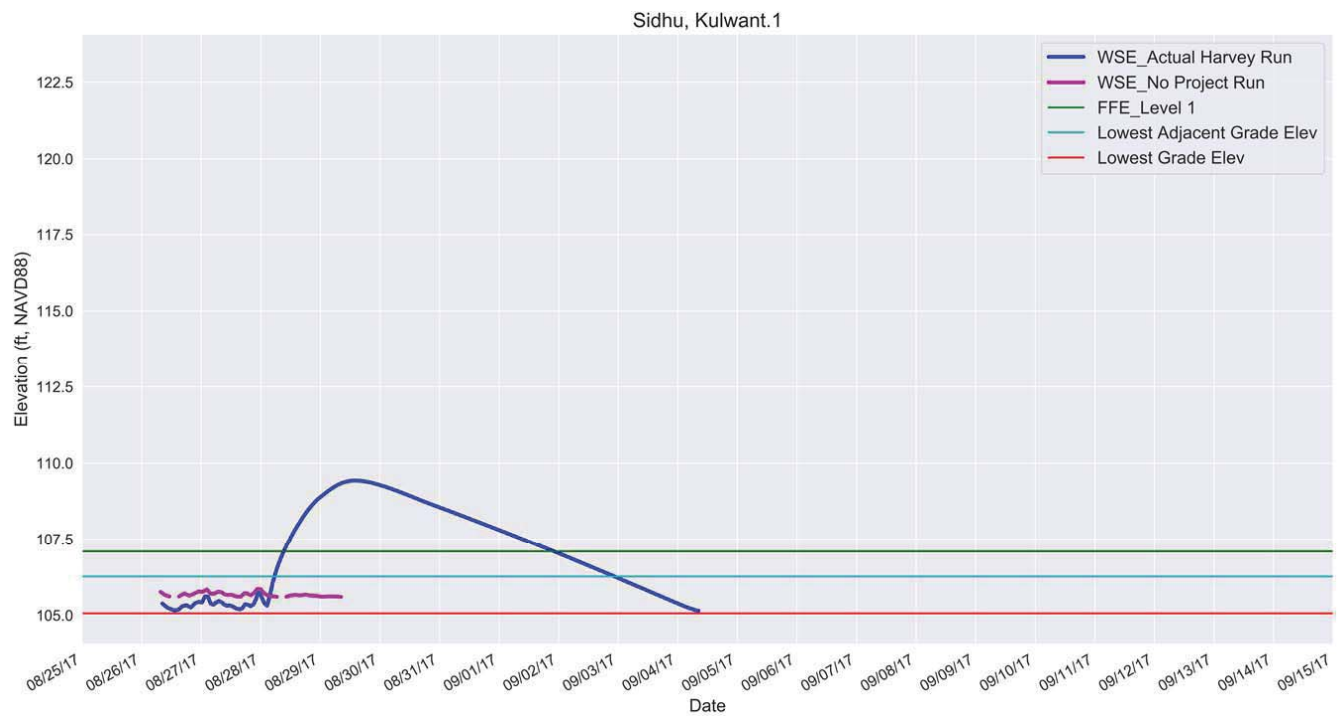


Figure 5-39: Simulated free water surface elevations at the property of Sidhu, Kulwant (Actual Harvey Run and No Project Run)

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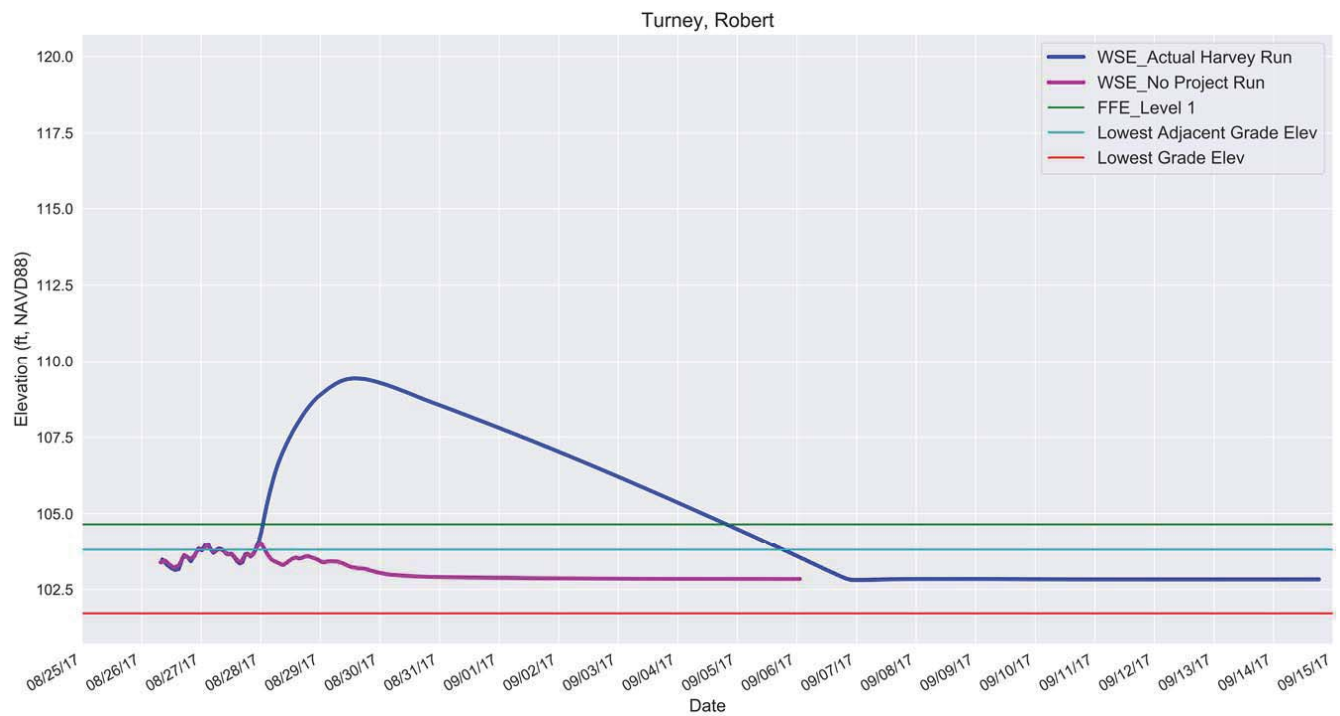


Figure 5-40: Simulated free water surface elevations at the property of Turney, Robert (Actual Harvey Run and No Project Run)

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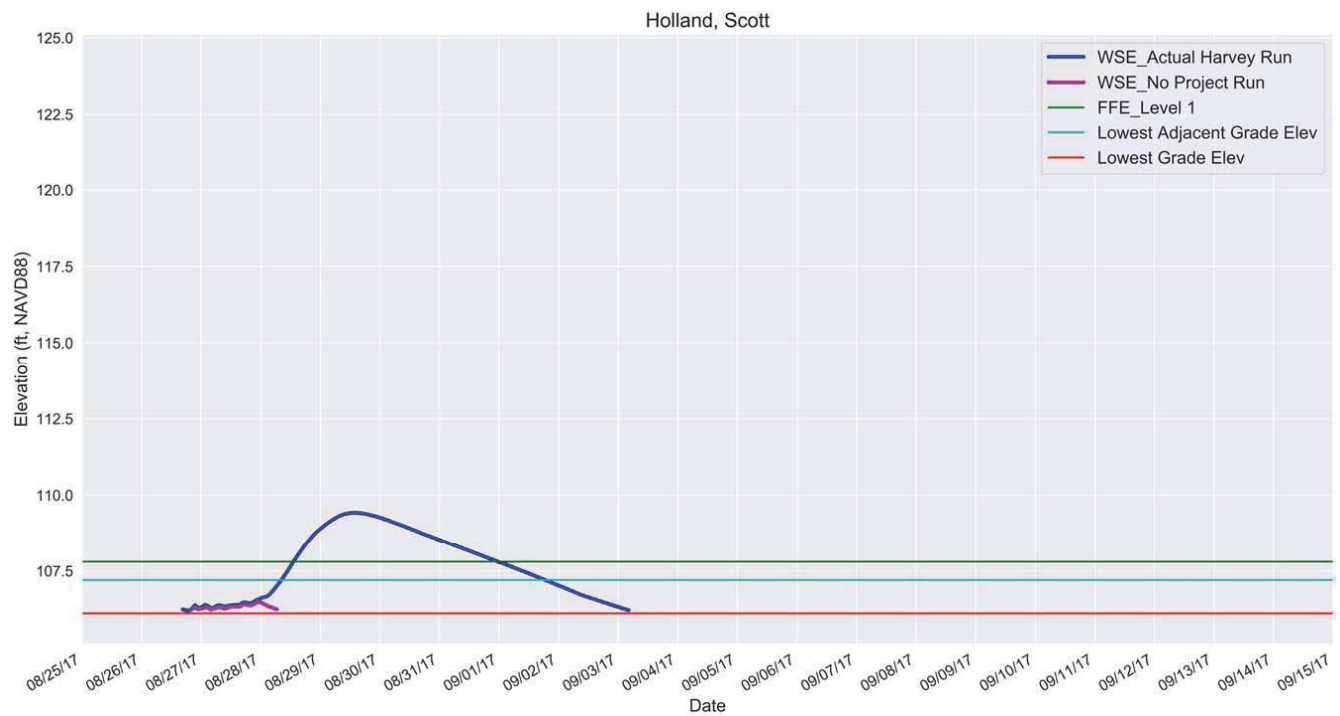


Figure 5-41: Simulated free water surface elevations at the property of Holland, Scott (Actual Harvey Run and No Project Run)

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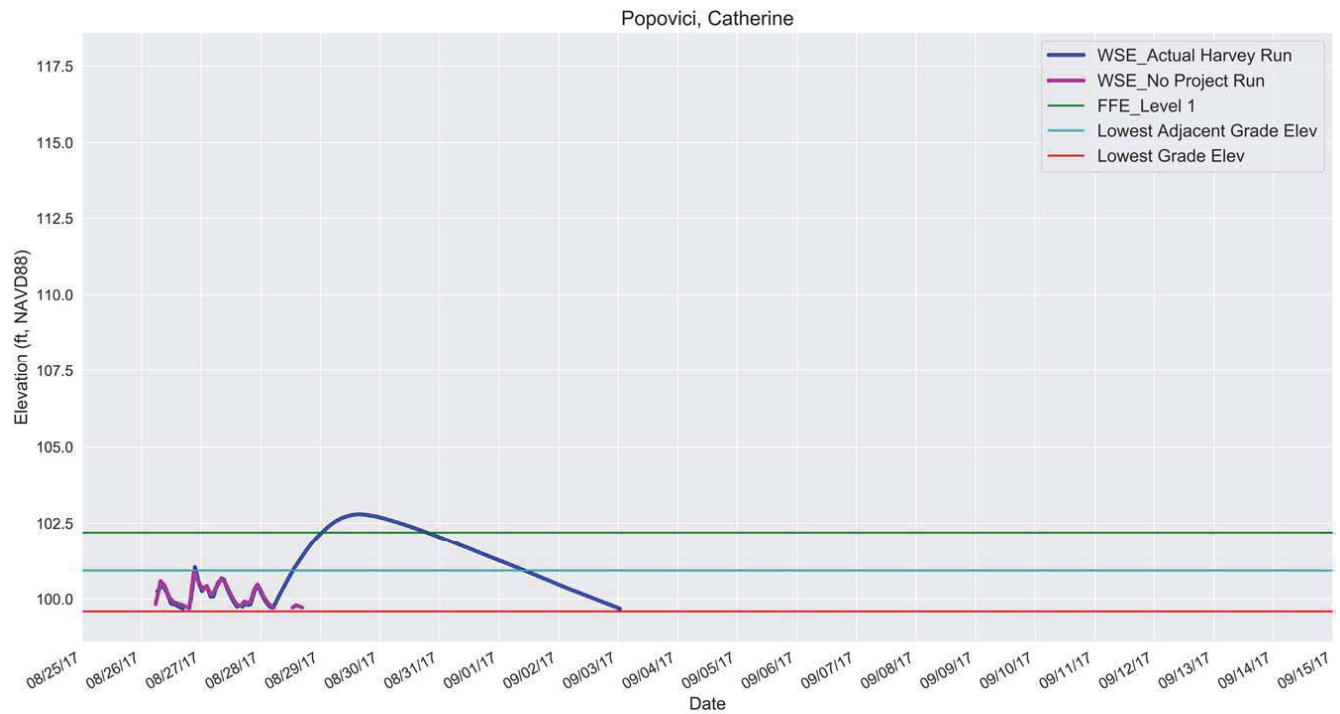


Figure 5-42: Simulated free water surface elevations at the property of Popovici, Catherine (Actual Harvey Run and No Project Run)

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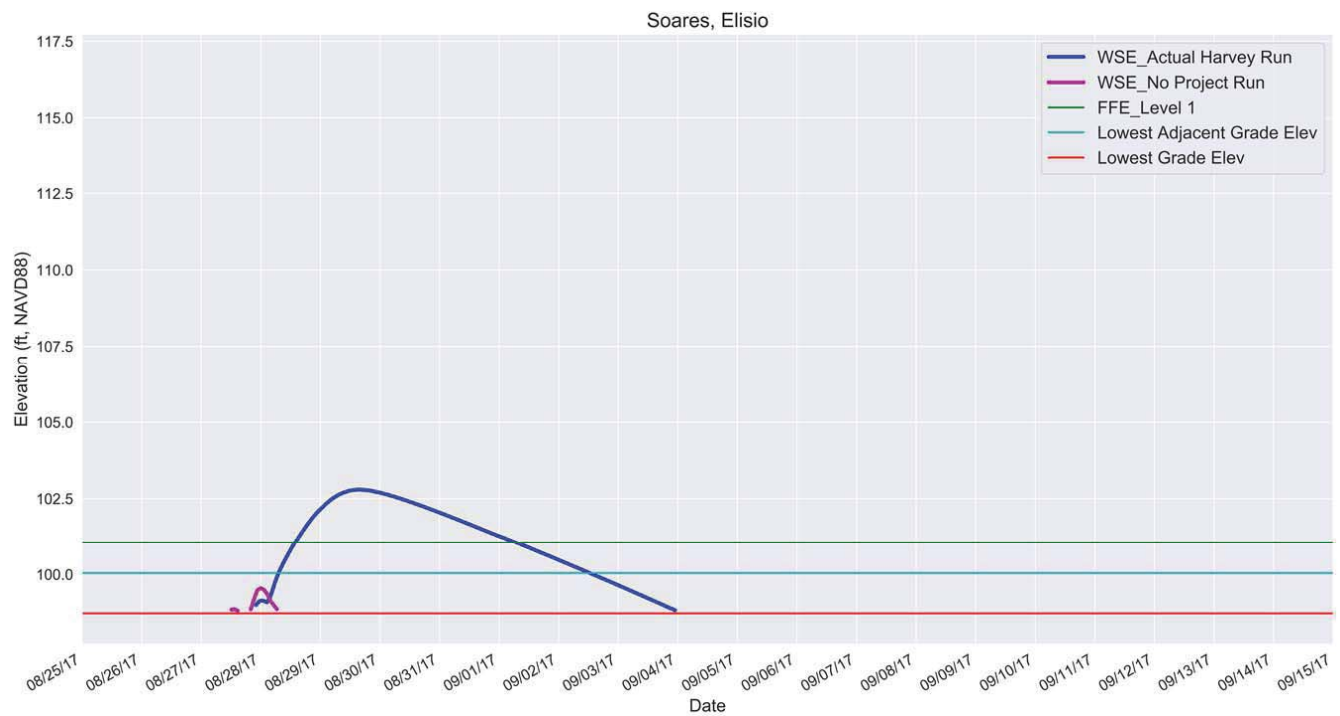


Figure 5-43: Simulated free water surface elevations at the property of Soares, Elisio (Actual Harvey Run and No Project Run)

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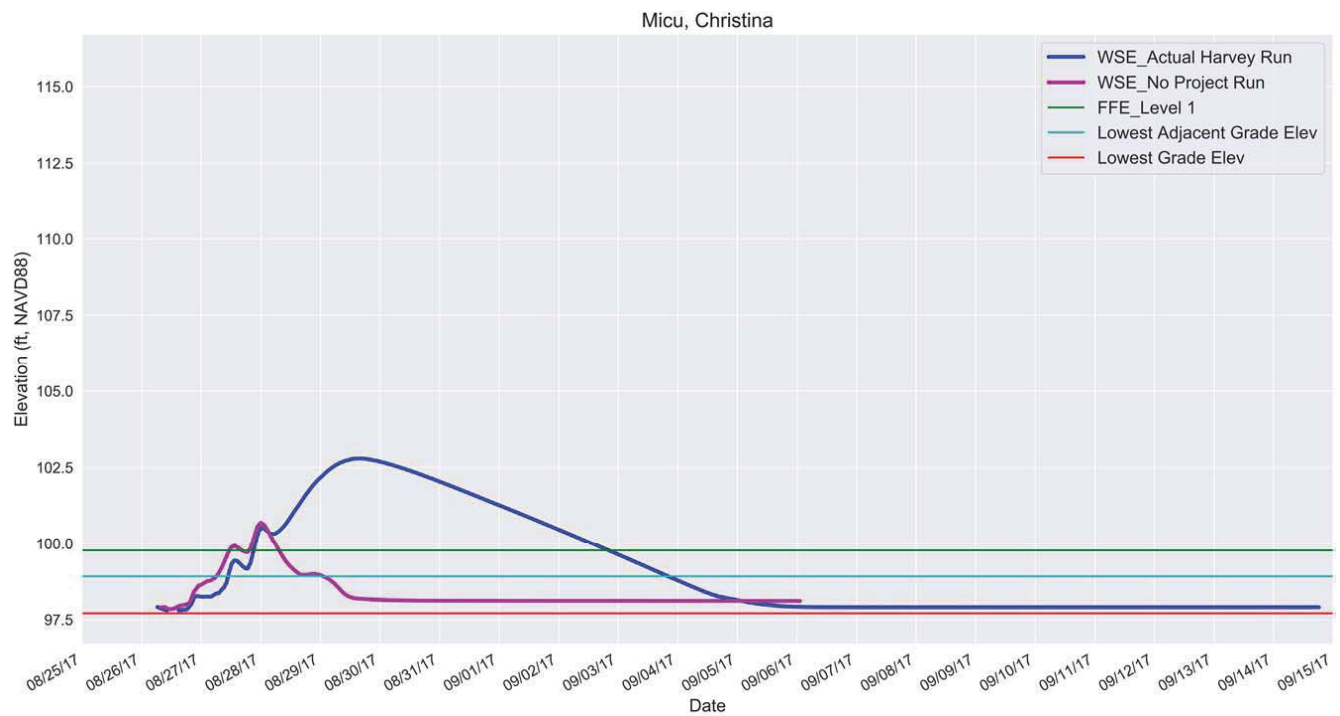


Figure 5-44: Simulated free water surface elevations at the property of Micu, Christina (Actual Harvey Run and No Project Run)

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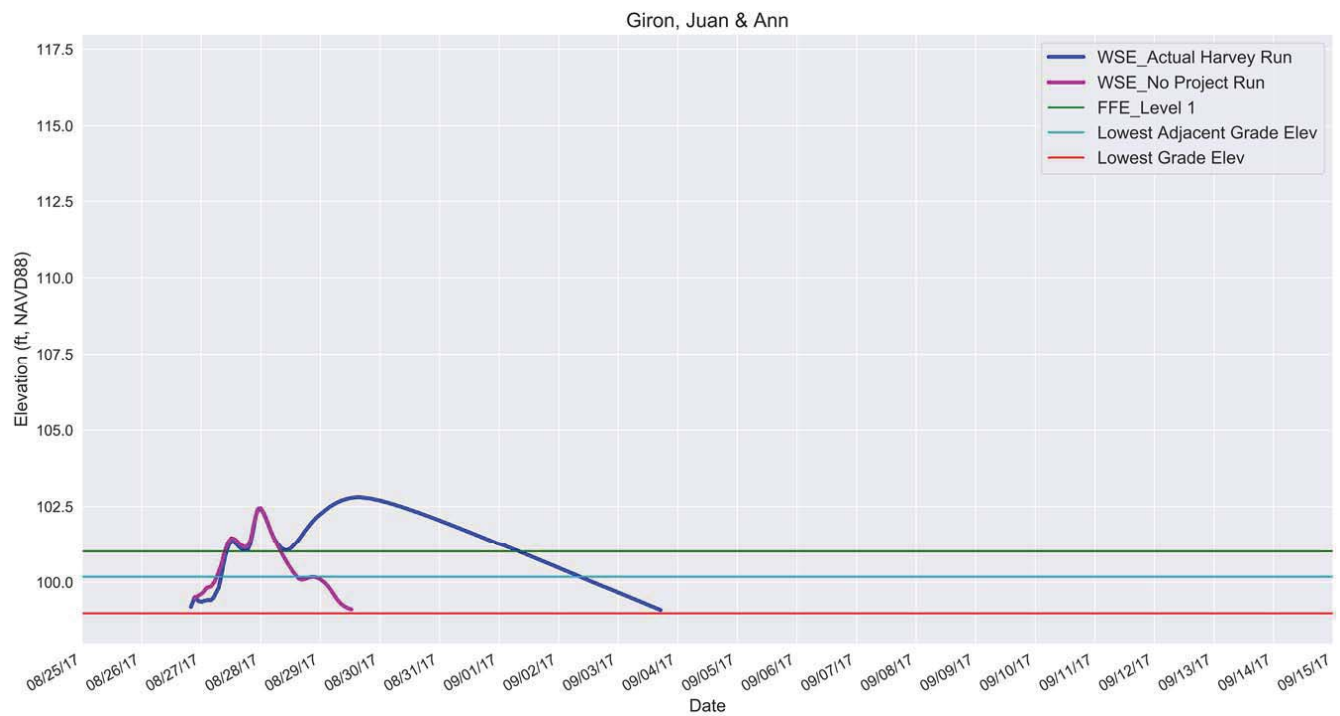


Figure 5-45: Simulated free water surface elevations at the property of Giron, Juan & Ann (Actual Harvey Run and No Project Run)

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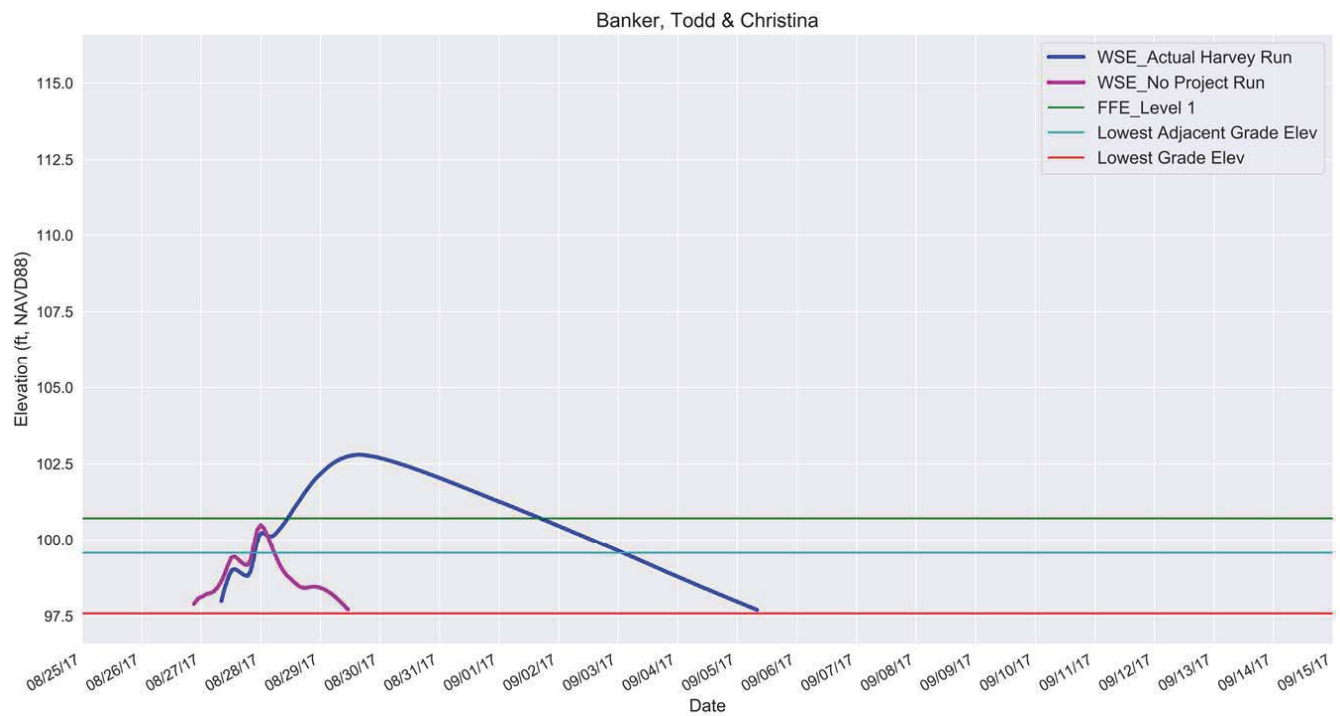


Figure 5-46: Simulated free water surface elevations at the property of Banker, Todd & Christina (Actual Harvey Run and No Project Run)

Innovation Engineered.

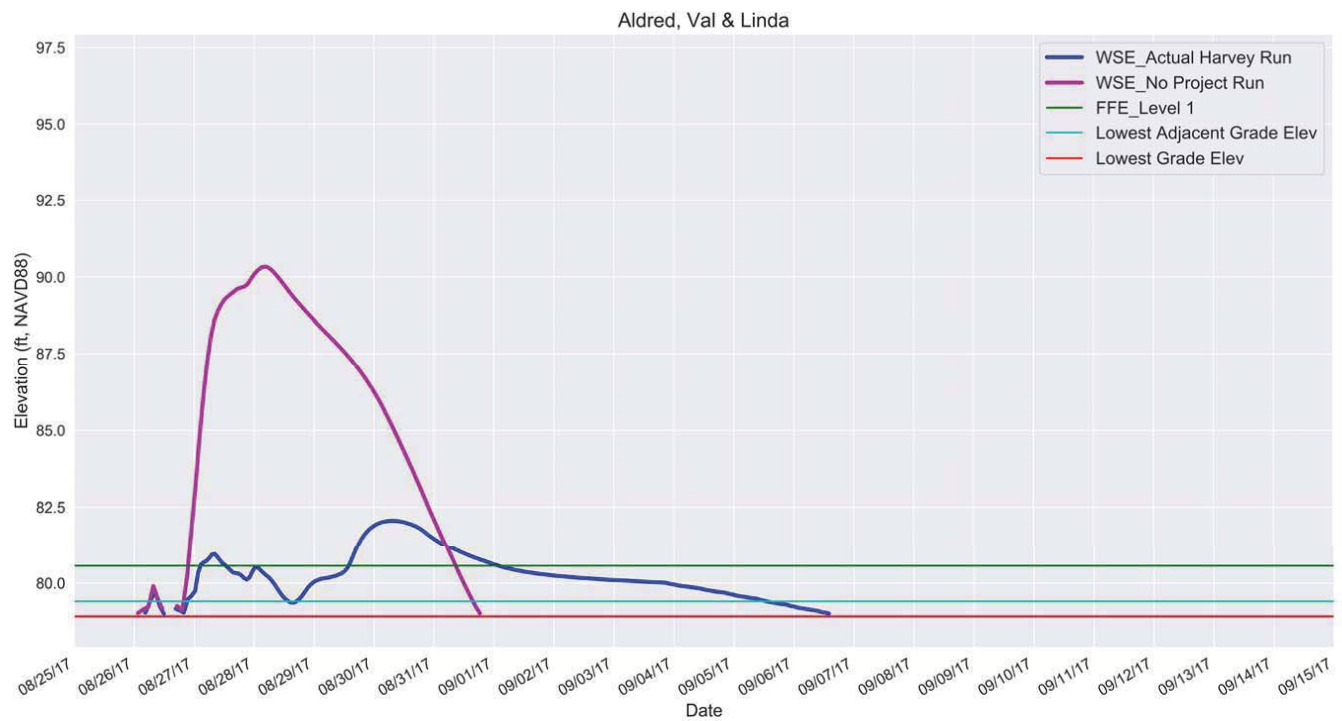


Figure 5-47: Simulated free water surface elevations at the property of Aldred, Val & Linda (Actual Harvey Run and No Project Run)

Innovation Engineered.

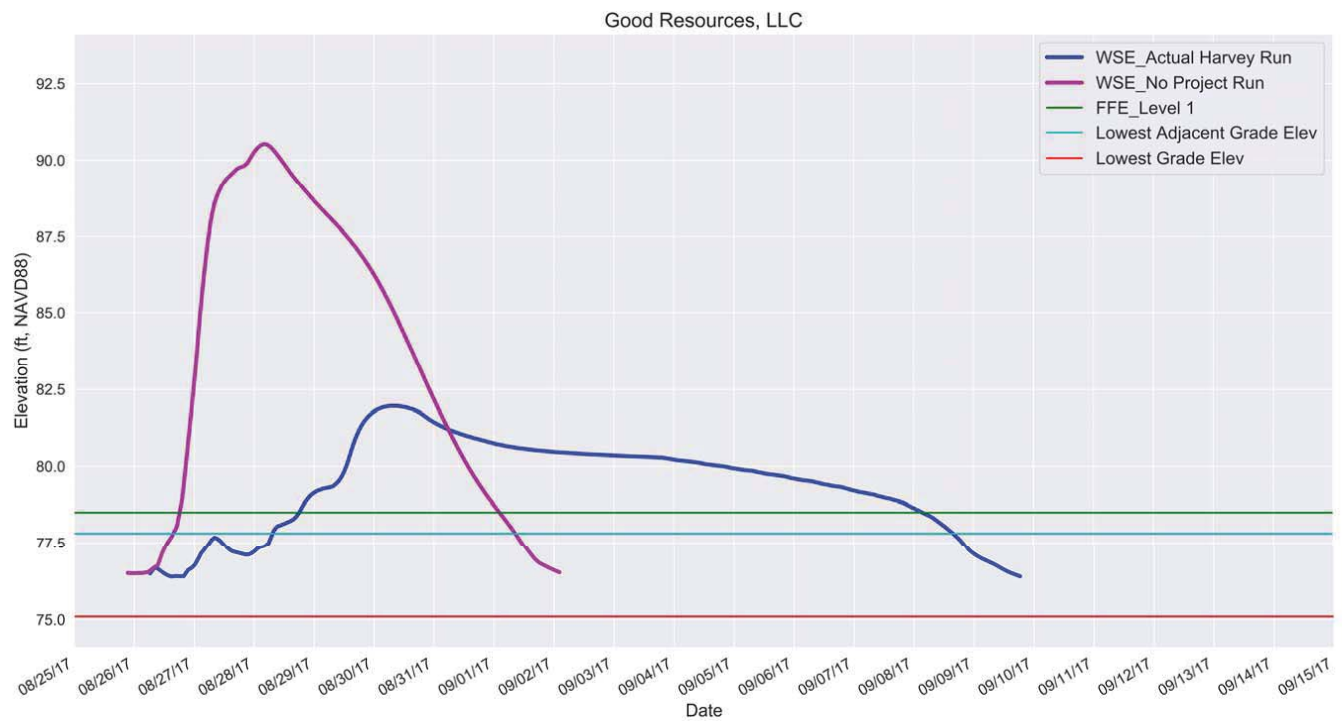


Figure 5-48: Simulated free water surface elevations at the property of Good Resources, LLC (Actual Harvey Run and No Project Run)

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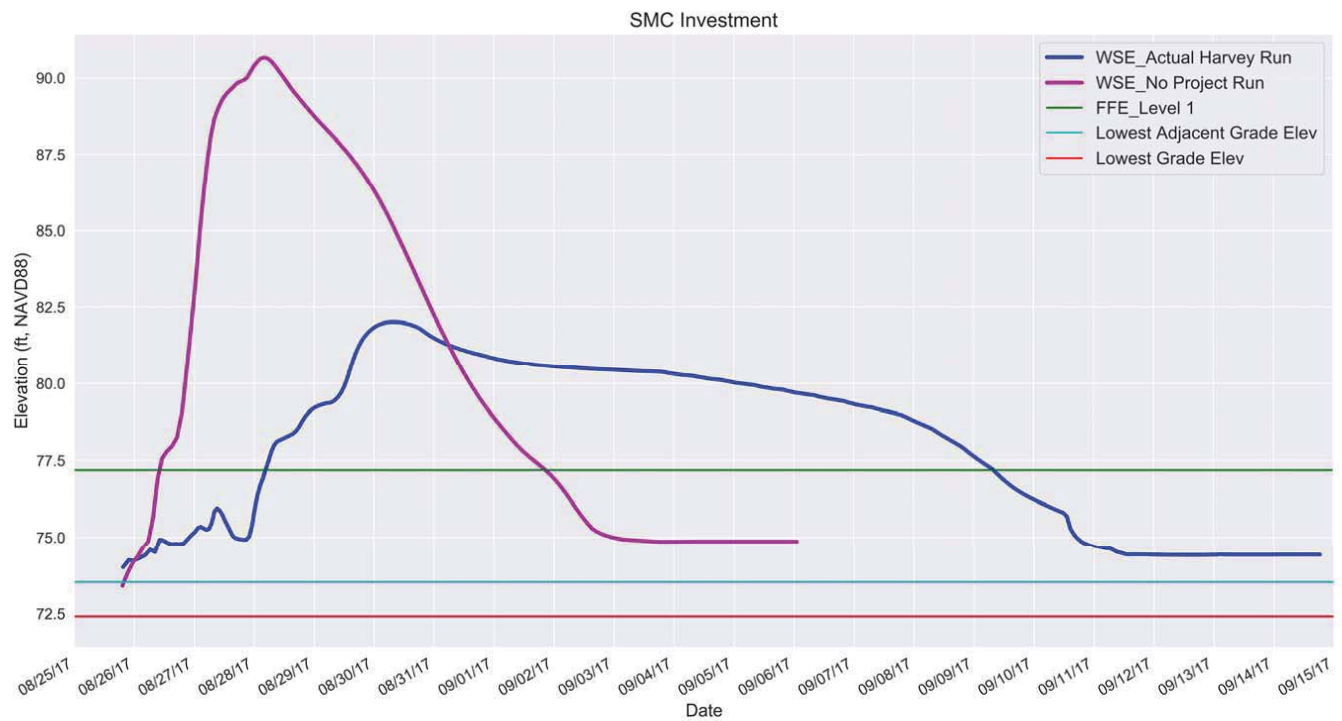


Figure 5-49: Simulated free water surface elevations at the property of SMC Investment (Actual Harvey Run and No Project Run)

Innovation Engineered.

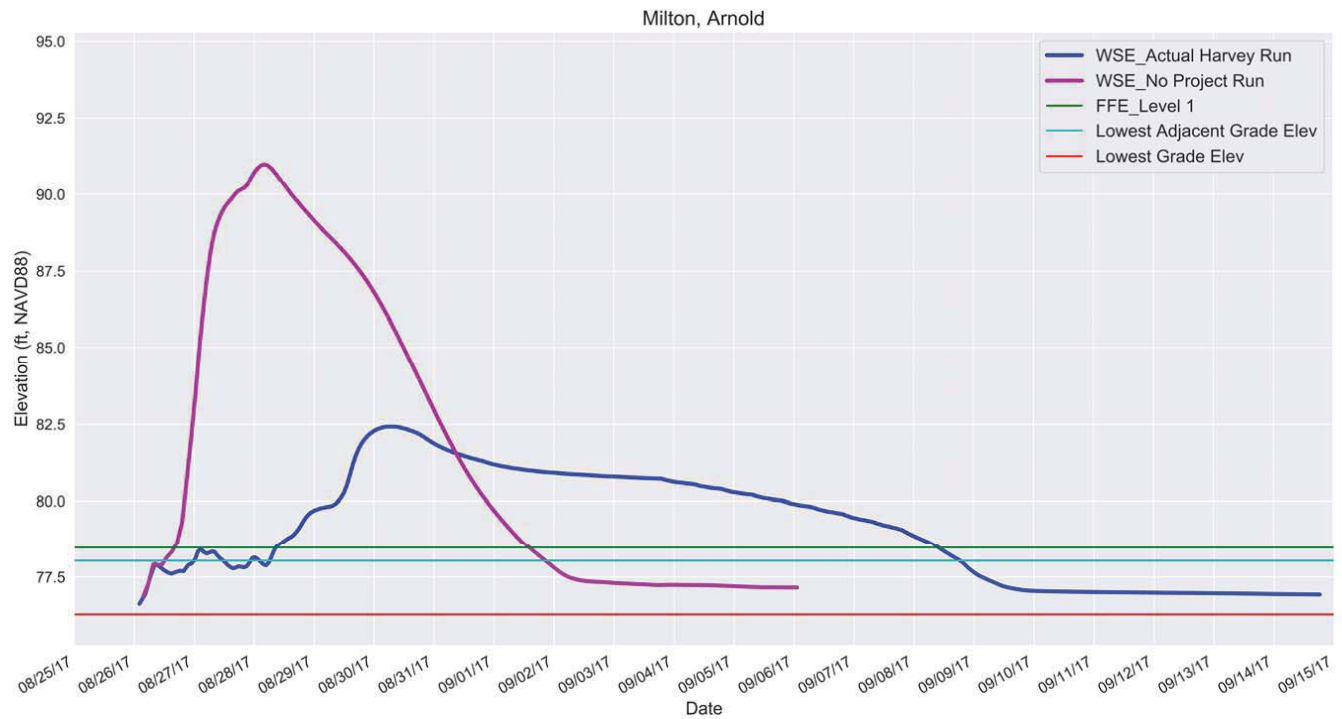


Figure 5-50: Simulated free water surface elevations at the property of Milton, Arnold (Actual Harvey Run and No Project Run)

Innovation Engineered.

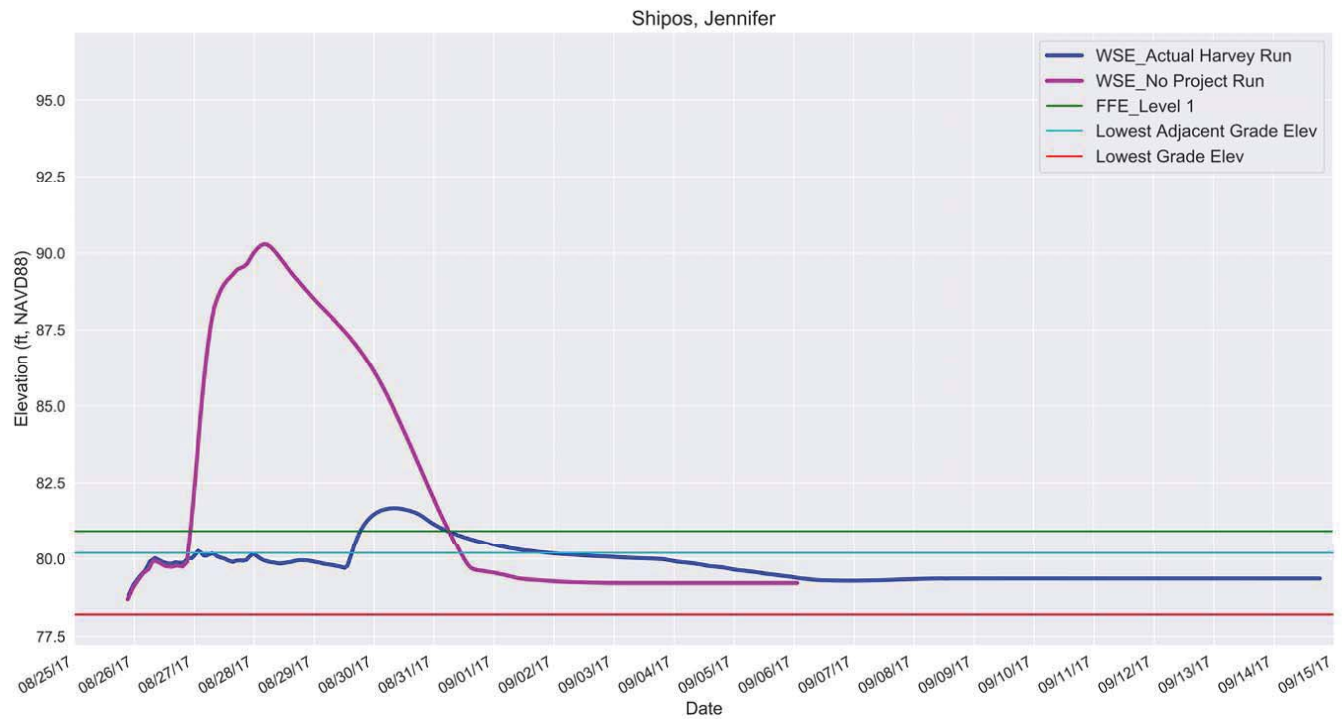


Figure 5-51: Simulated free water surface elevations at the property of Shipos, Jennifer (Actual Harvey Run and No Project Run)

Innovation Engineered.

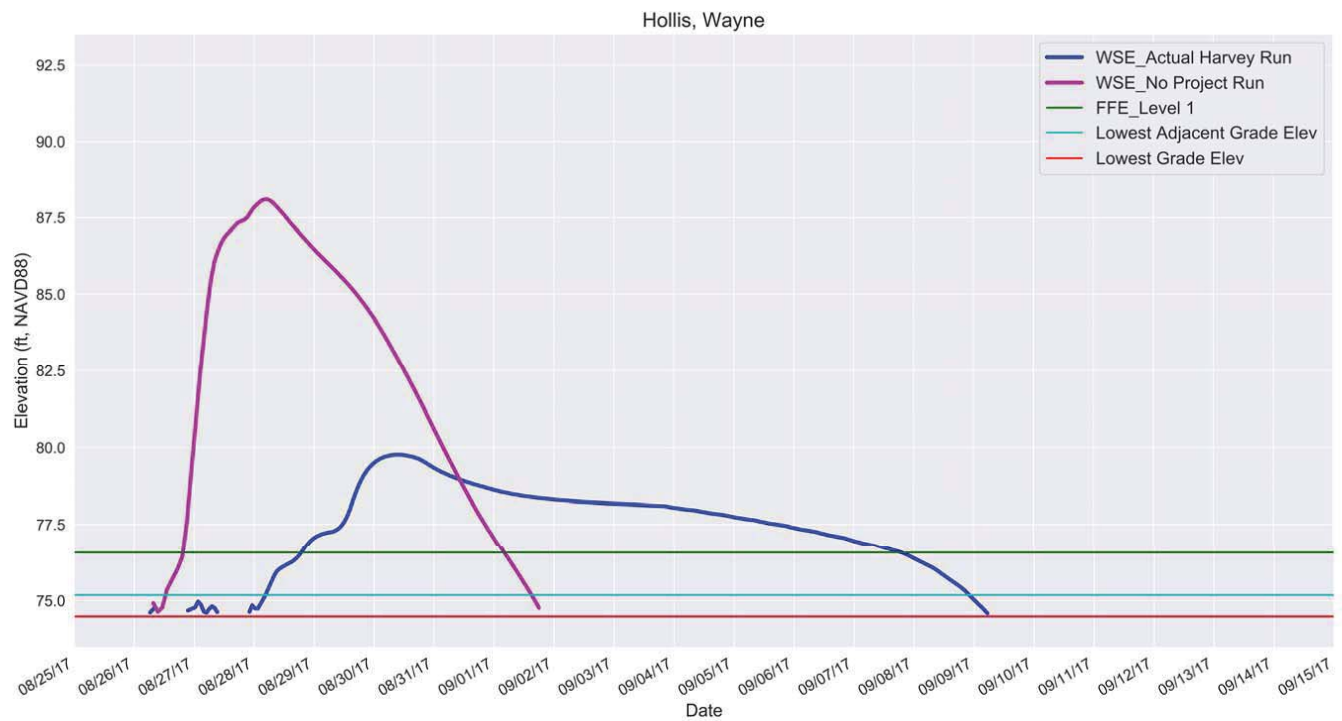


Figure 5-52: Simulated free water surface elevations at the property of Hollis, Wayne (Actual Harvey Run and No Project Run)

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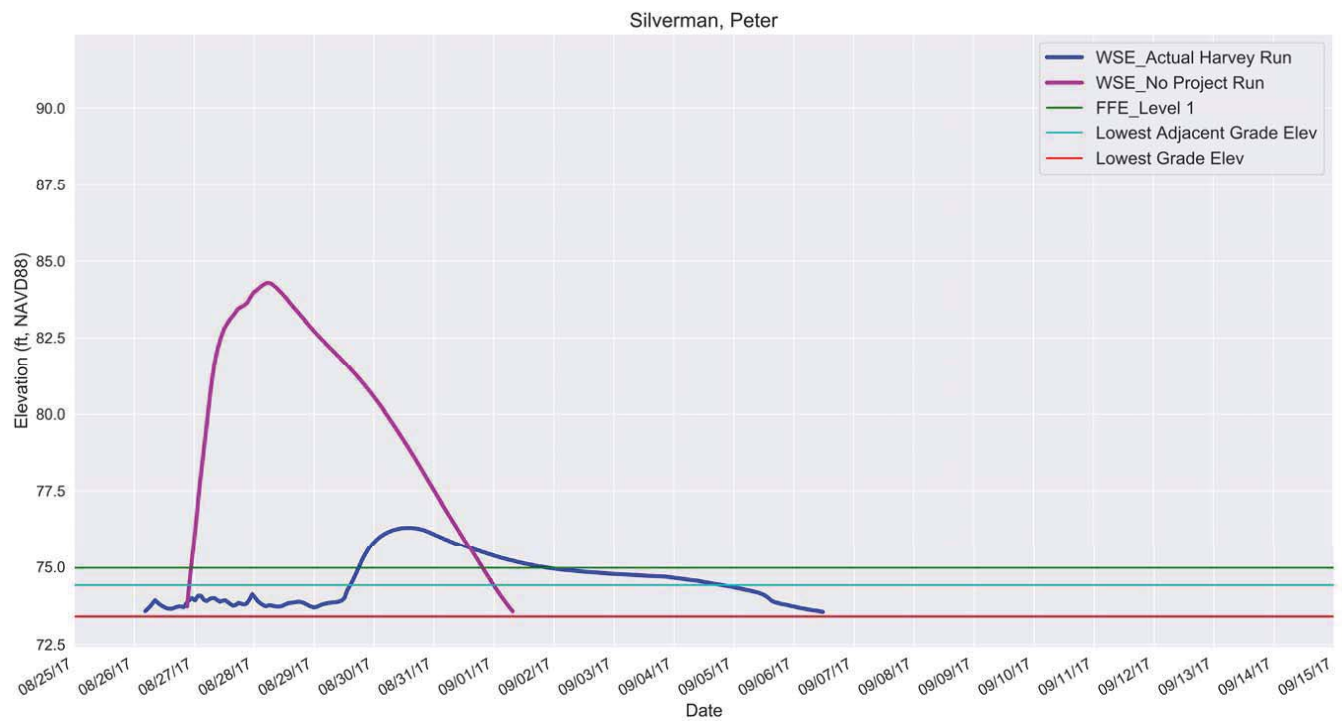


Figure 5-53: Simulated free water surface elevations at the property of Silverman, Peter (Actual Harvey Run and No Project Run)

Innovation Engineered.

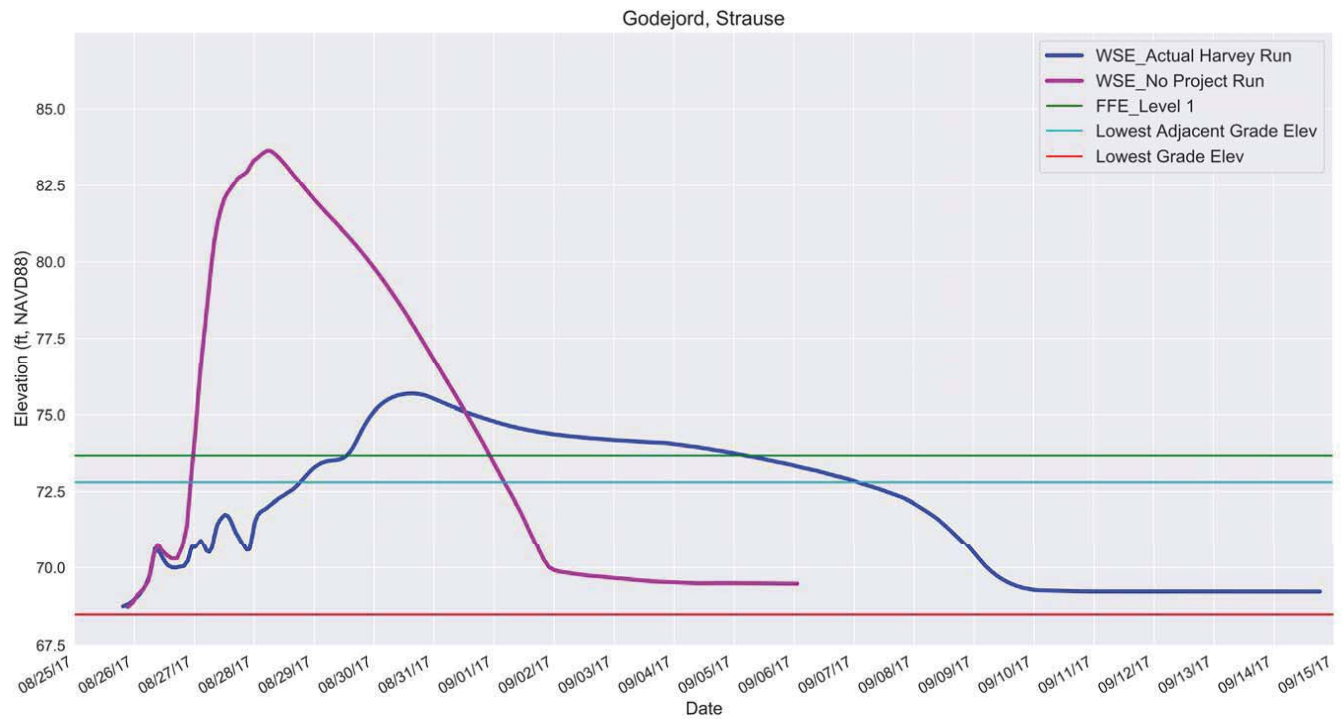


Figure 5-54: Simulated free water surface elevations at the property of Godejord, Strause (Actual Harvey Run and No Project Run)

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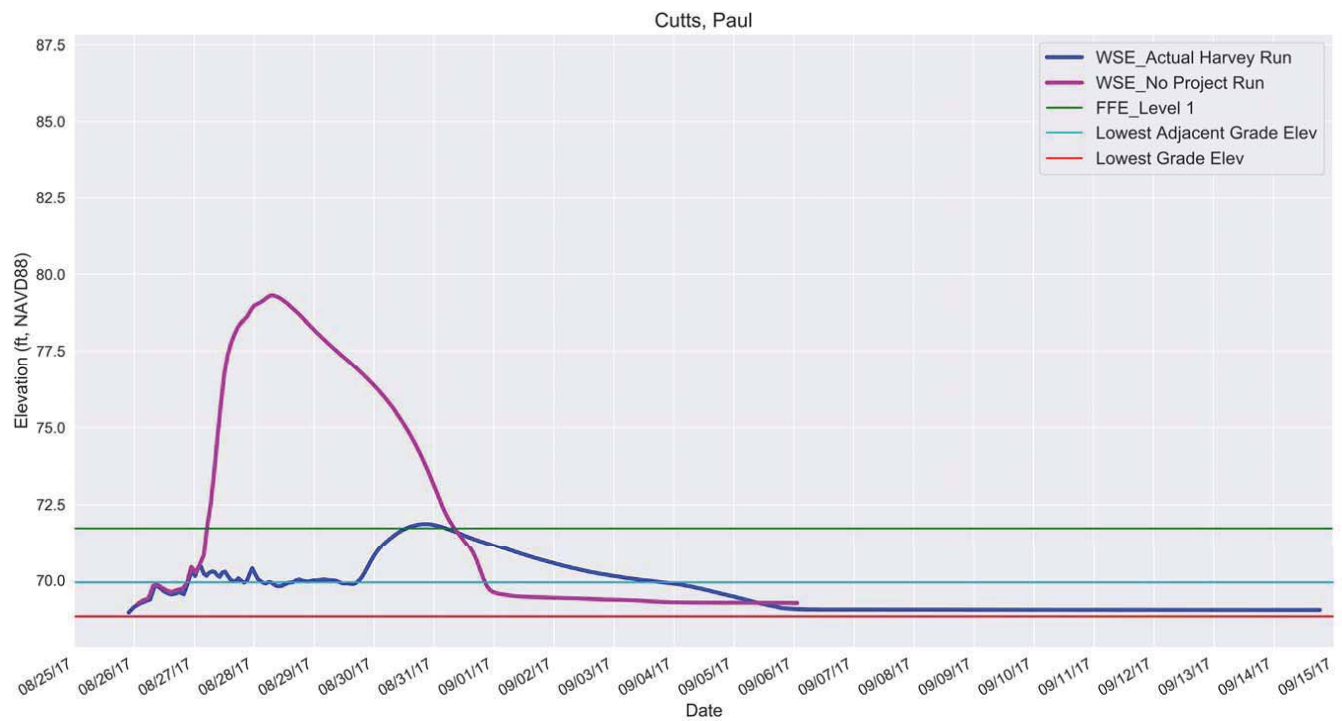


Figure 5-55: Simulated free water surface elevations at the property of Cutts, Paul (Actual Harvey Run and No Project Run)

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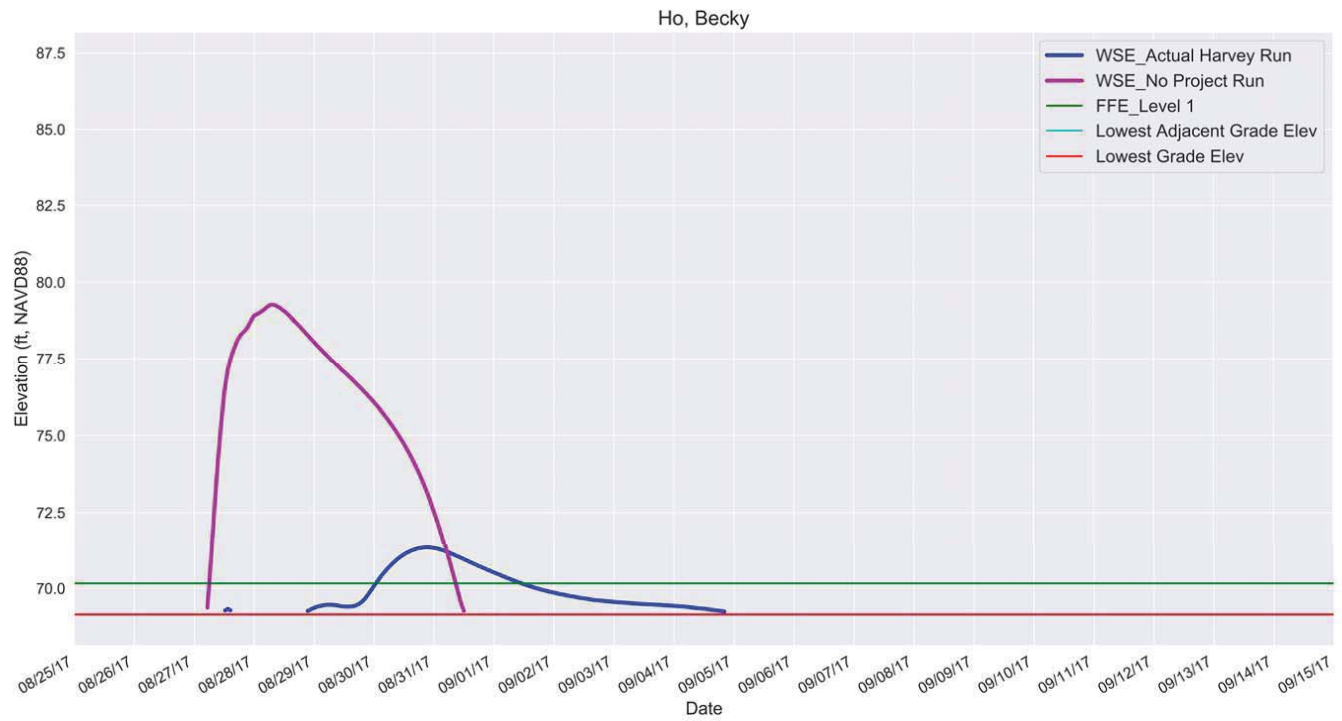


Figure 5-56: Simulated free water surface elevations at the property of Ho, Becky (Actual Harvey Run and No Project Run)

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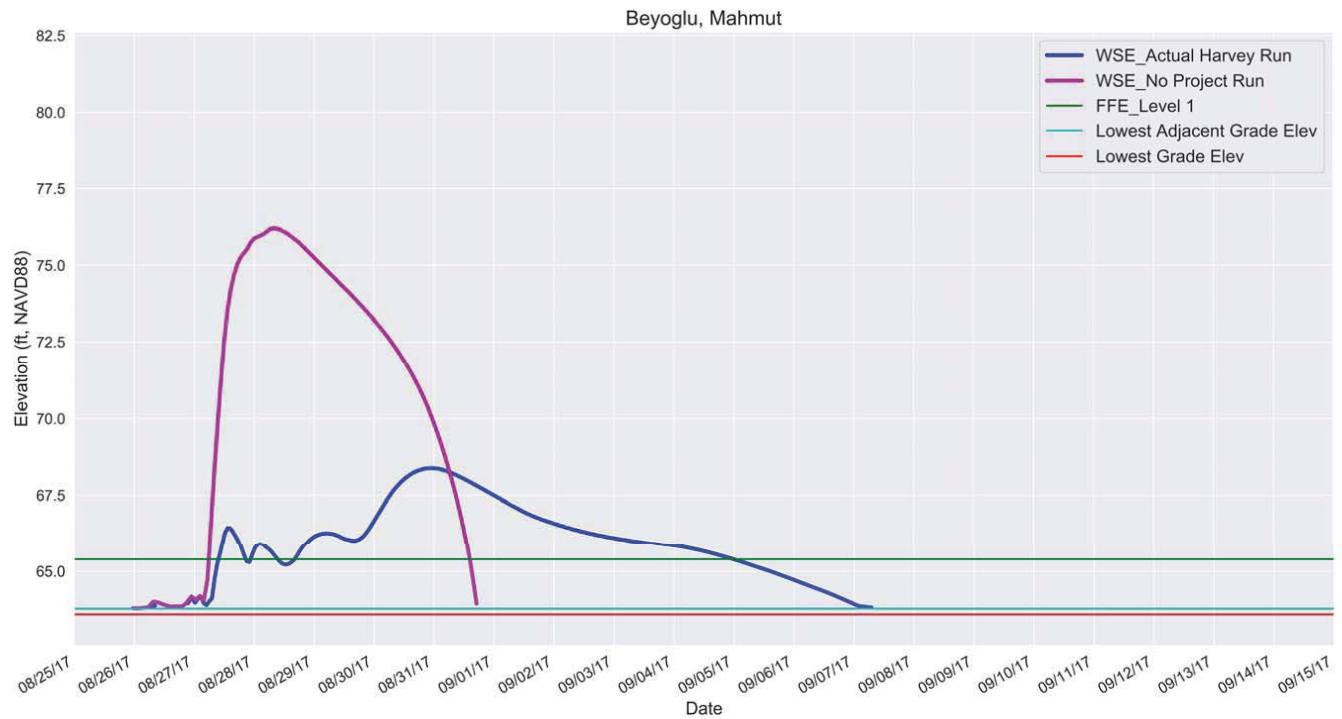


Figure 5-57: Simulated free water surface elevations at the property of Beyoglu, Mahmut (Actual Harvey Run and No Project Run)

Innovation Engineered.

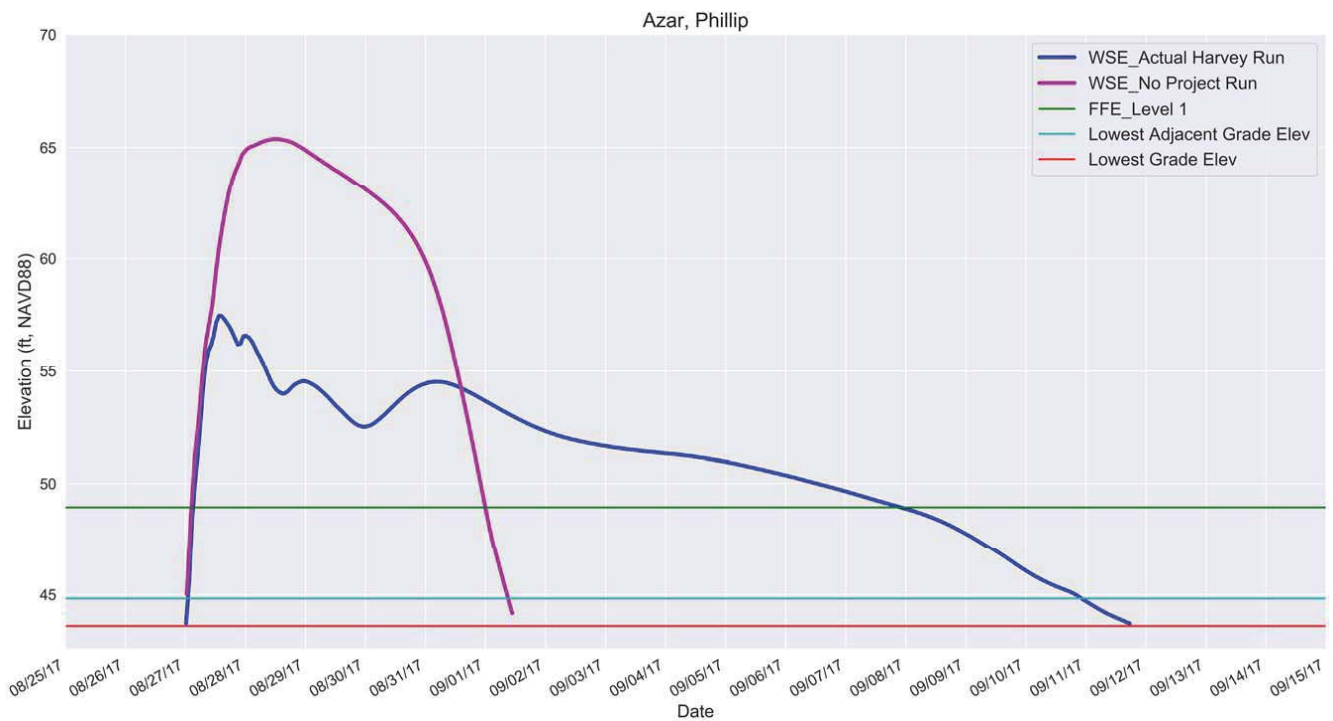


Figure 5-58: Simulated free water surface elevations at the property of Azar, Phillip (Actual Harvey Run and No Project Run)

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Figure 5-59: Simulated free water surface elevations at the property of Stahl, Timothy (Actual Harvey Run and No Project Run)

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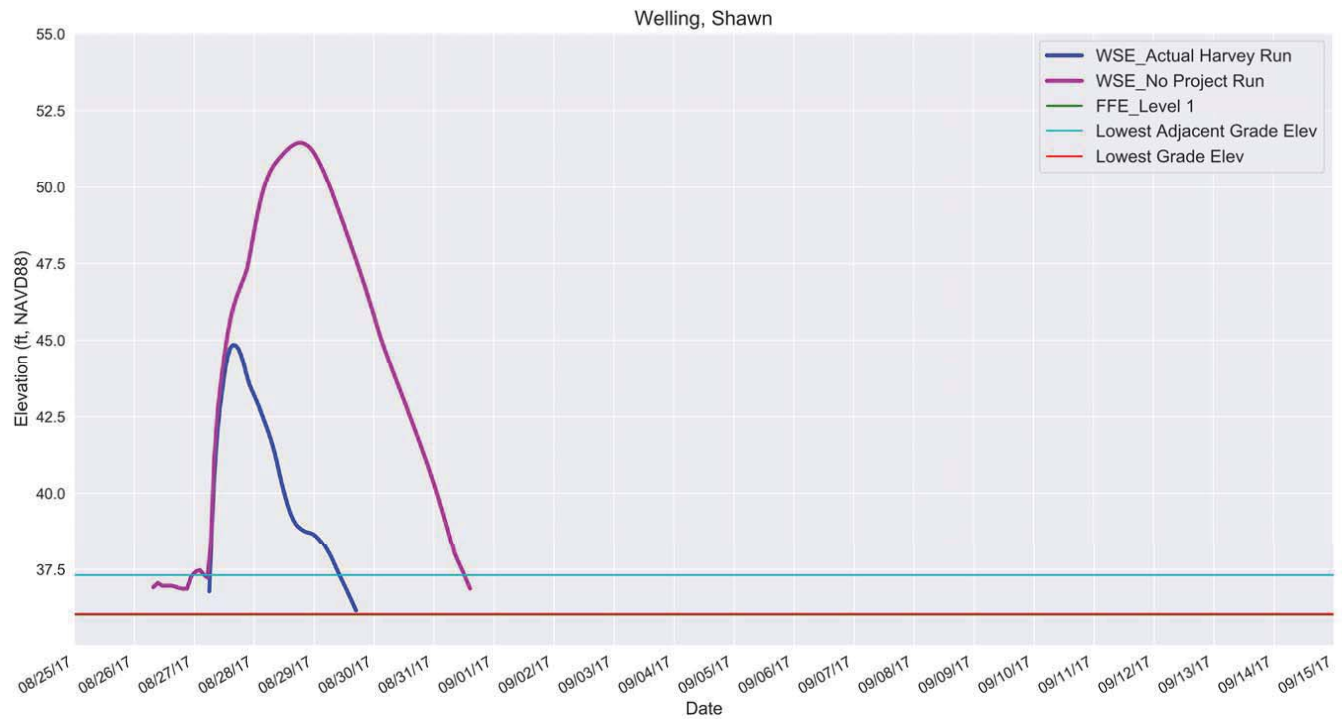


Figure 5-60: Simulated free water surface elevations at the property of Welling, Shawn (Actual Harvey Run and No Project Run)

5.2.3 Gates Closed Run

The Gates Closed Run simulates the Harvey Event under the assumption that no releases are made from the dams. As such, this run is identical to the Actual Harvey Run, except that flow through the dam conduits was deactivated. Table 5.5 presents summaries of the Gates Closed Run results at upstream Test Plaintiffs' locations.

We simulated flood depths above first finished floors for the upstream Test Properties under the hypothetical scenario of no releases from Addicks and Barker Reservoirs, which increased inundation up to 1.6 ft compared to flood depths predicted for the actual controlled release scenario during the Harvey Event. Simulated flood durations for upstream Test Properties under this hypothetical scenario are much longer than the actual controlled release scenario. During the Harvey Event, the controlled releases reduced flood depths, and particularly flood durations, for the upstream Test Properties as compared to a scenario where no releases were made.

A tabular comparison of the Actual Harvey Run and the Gates Closed Run is presented in later in Table 5.7.

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Table 5.5: Summary of the Gates Closed Run Results at Upstream Test Plaintiffs

Plaintiff	Elevations (ft, NAVD88)					Max Depth above First Finished Floor (ft)	Flooding duration above First Finished Floor
	Lowest Grade	Garage Elevation	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Lakes on Eldridge	106.3	-	108.4	108.9	-	1.1	9 day, 11 hr
Wind, Kurt & Jean	106.9	108.6	108.2	109.2	109.3	0.9	6 day, 14 hr
Mitchell, Stewart	105.7	108.5	108.0	109.0	-	1.1	8 day, 14 hr
West Houston Airport Corp.	106.6	-	107.5	108.6		1.5	15 day, 11 hr
Mitchell, Mario	119.9	121.5	121.1	121.9	-	1.8	1 day, 13 hr
Burnham, Elizabeth	102.6	105.0	104.0	105.5	-	4.5	> 17 day, 19 hr
Sidhu, Kulwant	105.1	-	106.3	107.1	116.7	3.0	> 17 day, 10 hr
Turney, Robert	101.7	104.2	103.8	104.7	-	5.4	> 17 day, 18 hr
Holland, Scott	106.1	107.4	107.2	107.8	-	2.2	> 17 day, 7 hr
Popovici, Catherine	99.6	101.7	100.9	102.2	-	1.7	> 16 day, 21 hr
Soares, Elisio	98.7	100.7	100.0	101.1	-	2.9	> 17 day, 6 hr
Micu, Christina	97.7	99.6	98.9	99.8	-	4.2	> 17 day, 21 hr
Giron, Juan & Ann	99.0	101.0	100.2	101.0	101.5	2.9	> 18 day, 9 hr
Banker, Todd & Christina	97.6	100.2	99.6	100.7	-	3.2	> 17 day, 9 hr

5.2.4 Gates Open Run

The Gates Open Run simulates the Harvey Event under the assumption of uncontrolled release (maximum release) from the dams. As such, this run is identical to the Actual Harvey Run, except that gate height openings were maximized for both dams (6 ft in Addicks and 7 ft in Barker). Table 5.6 presents summaries of the Gates Closed Run results at upstream and downstream Test Plaintiffs' locations.

Upstream of the reservoirs the simulated water surface elevations (and depth of floodwater above the first finished floor) under the uncontrolled releases (gates fully open) scenario are 0 to 2.1 ft lower than the actual controlled release Harvey scenario.

A tabular comparison of the Actual Harvey Run and the Gates Open Run is presented in later in Table 5.7.

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Table 5.6: Summary of the Gates Open Run Results at Upstream Test Plaintiffs

Plaintiff	Elevations (ft, NAVD88)					Maximum Depth above First Finished Floor (ft)	Flood duration above First Finished Floor
	Lowest Grade	Garage Elevation	Lowest Adjacent Grade	First Finished Floor	Other Finished Floor		
Lakes on Eldridge	106.3	-	108.4	108.9	-	-	-
Wind, Kurt & Jean	106.9	108.6	108.2	109.2	109.3	-	-
Mitchell, Stewart	105.7	108.5	108.0	109.0	-	-	-
West Houston Airport Corp.	106.6	-	107.5	108.6		-	-
Mitchell, Mario	119.9	121.5	121.1	121.9	-	1.8	1 day, 14 hr
Burnham, Elizabeth	102.6	105.0	104.0	105.5	-	2.3	4 day, 17 hr
Sidhu, Kulwant	105.1	-	106.3	107.1	116.7	0.7	2 day, 1 hr
Turney, Robert	101.7	104.2	103.8	104.7	-	3.2	5 day, 12 hr
Holland, Scott	106.1	107.4	107.2	107.8	-	0.02	0 day, 6 hr
Popovici, Catherine	99.6	101.7	100.9	102.2	-	-	-
Soares, Elisio	98.7	100.7	100.0	101.1	-	-	-
Micu, Christina	97.7	99.6	98.9	99.8	-	0.9	2 day, 19 hr
Giron, Juan & Ann	99.0	101.0	100.2	101.0	101.5	1.4	0 day, 20 hr
Banker, Todd & Christina	97.6	100.2	99.6	100.7	-	-	-

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5.2.5 Harvey-Related Model Results Summary

Table 5.7 summarizes results of Harvey-related runs for the upstream Test Plaintiffs. Maximum inundation depths are calculated as the difference between the maximum simulated water surface elevation and the elevation of the first finished floor at each Test Plaintiff. There may be several periods of flooding above first finished floor during the Harvey Event. The duration of flooding above the first finished floor shown in the table is the total duration from the start of the first flooding period to the end of the last flooding period.

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Table 5.7: Summary of Harvey-related run results for Upstream Plaintiffs

Plaintiff	Maximum depth of inundation above FFE (ft)				Duration (hr)			
	Actual Harvey	No Project	Gates Closed	Gates Open	Actual Harvey	No Project	Gates Closed	Gates Open
Lakes on Eldridge	0.5	-	1.1	-	33	-	227	-
Wind, Kurt & Jean	0.2	-	0.9	-	22	-	158	-
Mitchell, Stewart	0.4	-	1.1	-	30	-	206	-
West Houston Airport Corp.	0.8	-	1.5	-	50	-	371	-
Mitchell, Mario	1.8	1.8	1.8	1.8	37	39	37	38
Burnham, Elizabeth	3.9	1.1	4.5	2.3	163	31	> 427	113
Sidhu, Kulwant	2.3	-	3.0	0.7	108	-	> 418	49
Turney, Robert	4.8	-	5.4	3.2	186	-	> 426	132
Holland, Scott	1.6	-	2.2	0.02	82	-	> 415	6
Popovici, Catherine*	0.6	-	1.7	-	42	-	> 405	-
Soares, Elisio	1.7	-	2.9	-	87	-	> 414	-
Micu, Christina	3.0	0.9	4.2	0.9	142	18	> 429	67
Giron, Juan & Ann	1.8	1.4	2.9	1.4	117	21	> 441	20
Banker, Todd & Christina	2.1	-	3.2	-	101	-	> 417	-

* According to Plaintiff's deposition [50, p. BAIRD0000346] there was no flooding above the FFE.

6. Conclusions

The objective of this hydraulic study was to define hydraulic factors that resulted in inundation during the Harvey Event at upstream Test Properties. To address this objective, we reviewed pertinent gage data and background documents. In addition, we developed a numerical model to simulate inundation during the Harvey Event to provide a full description of inundation in time and space and to simulate hypothetical scenarios to define and/or isolate hydraulic factors contributing to inundation.

Hurricane Harvey exceeded Addicks and Barker Reservoirs hydraulic design conditions

The Addicks and Barker dams are designed for short term impoundment of storm water runoff. The United States Army Corps of Engineers (the Corps) designed the reservoirs based on inflow hydrographs exceeding the estimated runoff during the 1935 flood, which was the storm of record at that time.

After construction of the dams, the concept of Standard Project Floods (SPFs) entered the lexicon. The SPF is the flood that represents the most severe hydrologic conditions considered reasonably characteristic of the geographic region. The SPF has been revised for the dams over time. It was defined in the 1962 Reservoir Regulation Manual and most recently updated in the 1977 Hydrology Report. During the Hurricane Harvey event, the combined cumulative inflows to Addicks and Barker Reservoirs reached at least 450,000 acre-feet. This exceeded the 1962 SPF cumulative inflows by 63% (in addition to exceeding the 1962 SPF peak inflows by 2 to 4 times) and exceeded the 1977 revised SPF cumulative inflow to Addicks and Barker Reservoirs by 41%. The Harvey Event also exceeded the 2012 Water Control Manual SPF water surface elevations and resulted in uncontrolled spill around the north end of Addicks Reservoir for the first time in the history of the project. Due to the intensity and duration of rainfall associated with the Harvey Event, the Corps made releases in accordance with the induced surcharge release schedule for the first time in the history of the two reservoirs.

The Harvey Event exceeded the original and the revised SPF cumulative inflows to Addicks and Barker Reservoirs.

Addicks and Barker Reservoir capacities are smaller than the volume of the floodwater generated during the Harvey Event, but they effectively reduced peak flows downstream of the dams, as they were designed to do.

The combined capacity of Addicks and Barker Reservoirs is 210,500 acre-feet (68.6 billion gallons) of water within the Government Owned Land (GOL). This combined capacity is approximately 20% greater than the amount of floodwater generated under the pre-Harvey 100-year food frequency. During the Harvey Event, at least 450,000 acre-feet of floodwater flowed into Addicks and Barker Reservoirs significantly exceeding their combined capacity and dictating significant releases from the reservoirs.

The maximum combined discharge capacity of Addicks and Barker release conduits is approximately 16,000 cfs. During the Harvey Event, floodwater inflow rates to Addicks and Barker Reservoirs reached at least 160,000 cfs. Therefore, the maximum combined capacity of the release conduits was significantly exceeded. The difference in magnitude between the rapid inflow rates and the restricted outflow rates resulted in an initially rapid increase of water surface elevations behind the dams.

Despite the releases that were made during the Harvey Event, the reservoirs effectively reduced peak flows downstream of the dams, as they were designed to do.

Flooding was unavoidable during the Harvey Event

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Flooding during the Harvey Event was unavoidable due to the following reasons:

- The total cumulative inflows to Addicks and Barker Reservoirs during the Harvey Event was more than twice the combined capacity of the reservoirs within the GOL.
- The maximum combined capacity of the release conduits could not discharge the excess volume of water during the Harvey Event. As such, upstream flooding was unavoidable.
- The Harvey Event exceeded the hydraulic design conditions of the Addicks and Barker Reservoirs, which required releases in accordance with the induced surcharge schedule. As such, downstream flooding was unavoidable.

Our modeling efforts showed that opening the gates entirely or, alternatively, never constructing the dams, would have resulted in much higher flooding to downstream properties, including the downstream Test Properties, than actually occurred. We utilized a similar modeling approach in the downstream sub-case using the same model inputs used for the upstream sub-case. We summarize those results for the downstream Test Properties in Appendix C. The downstream modeling results demonstrate clearly that flooding during the Harvey Event was unavoidable.

Opinions based on Simulation of Hypothetical Flood Events

Combined impact of the federal project during the Harvey Event

The federal project allows for the distribution of flood impacts across a wide area to minimize the chance of life-threatening conditions in any one area. Simulated maximum flood depths above first finished floors are between 0.2 to 4.8 ft for the upstream Test Properties, which are similar to the flood depths above finished floors at downstream Test Properties. Despite the damage due to flooding, the federal project prevented significant property damages and significantly reduced the risk of loss of life for downstream areas.

Our modeling efforts demonstrate that finished first floors on three of the thirteen upstream Test Properties would have experienced some flooding even in the absence of the federal project, which includes the Addicks and Barker Reservoirs. With the federal project in place, peak flood elevations at all of the upstream Test Properties are attributed to backwater due to high pool elevation in Addicks or Barker Reservoirs, with the exception of flooding at Mr. Mario Mitchell's property, which is no longer a Test Property since he dismissed his claim. At very high pool elevations, the rate of rise decreases significantly due to the increased reservoir capacities at such elevations. As such, backwater flooding upstream of the reservoirs is characterized by a gradual rate of rise for these elevations.

Impact of uncontrolled releases during the Harvey Event (gates fully open scenario)

Our modeling efforts demonstrate that finished first floors on six of the thirteen Test Properties would have experienced some flooding if the Corps had left the gates fully open throughout the duration of the Harvey Event.

Effectiveness of controlled releases during the Harvey Event

If the release gates of the dams had been left closed throughout the Harvey Event to minimize downstream impacts, our modeling efforts demonstrate that finished first floors on all thirteen upstream Test Properties would have experienced some flooding. Under the hypothetical scenario of no releases from Addicks and Barker Reservoirs during the Harvey Event, upstream Test Properties would have experienced 0.6 to 1.1 feet more flooding above finished first floor elevations as compared to the actual controlled release scenario. Simulated flood durations at upstream Test Properties under this hypothetical no releases scenario are much longer than under the actual controlled release scenario. During the Harvey Event, the controlled releases resulted in the reduction of flood depths, and particularly flood durations, at the upstream Test Properties.

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Appendix A Addicks and Barker Discharge Equations

A.1 Addicks and Barker Outlets

A.1.1 Introduction

The Addicks and Barker Reservoirs include controlled variable-height gates. Each reservoir outlet is equipped with five gated conduits (middle conduit includes 2 gates). Figures A-1 and A-2 show aerial views of Addicks and Barker outlets, respectively.



Figure A-1: Aerial view of the Addicks Reservoir gates. Source: Imagery ©2018 Google.



Figure A-2: Aerial view of the Barker Reservoir gates. Source: Imagery ©2018 Google.



Figure A-3: The Barker gate outlet channel showing 5 conduits. Source: Imagery ©2018 Google.

In both reservoirs, the upstream side of the outlet includes two water elevation sensors: a radar sensor and a pressure gage. These are used to report the headwater elevations for calculations. Also, in both reservoirs, the downstream side is characterized by an expanding channel with flow gages downstream of the outlet (approximately 250 m to 500 m downstream of the Barker and Addicks outlets, respectively).

A.1.2 Addicks Gate Gages

Addicks Gate has two gage stations: the upstream reservoir gage station (USGS 08073000) and the downstream reservoir gage station (USGS 08073100).

A.1.2.1 Upstream Reservoir Gage Station (USGS 08073000)

The upstream reservoir gage station contains instruments to measure the water elevation including a radar sensor and a pressure gage. The gages report the elevations in feet above NAVD88. The pressure gage is located in the “high orifice” as described on the USGS gage station website (USGS, 2018c). In addition to these measurements, the gage station reports the estimated reservoir storage volume.

A.1.2.2 Downstream Reservoir Gage Station (USGS 08073100)

The downstream reservoir gage station is a stage measurement station. During the Harvey Event, USGS measured discharges downstream of I-10, which is some 500 m downstream of the outlet.

A.1.3 Barker Gate Gages

Barker Gate has two gage stations: the upstream reservoir gage station (USGS 08072500) and the downstream reservoir gage station (USGS 08072600).

A.1.3.1 Upstream Reservoir Gage Station (USGS 08072500)

The upstream reservoir gage station contains instruments to measure the water elevation including a radar sensor and pressure gage. The gages report the elevations in feet above NAVD88. The pressure gage is located in the “high orifice” as described on the USGS gage station website (USGS, 2018a). In addition to these measurements, the gage station reports precipitation and the estimated reservoir storage volume.

A.1.3.2 Downstream Reservoir Gage Station (USGS 08072600)

The downstream reservoir gage station is a stage measurement station located at the downstream side of Highway 6.

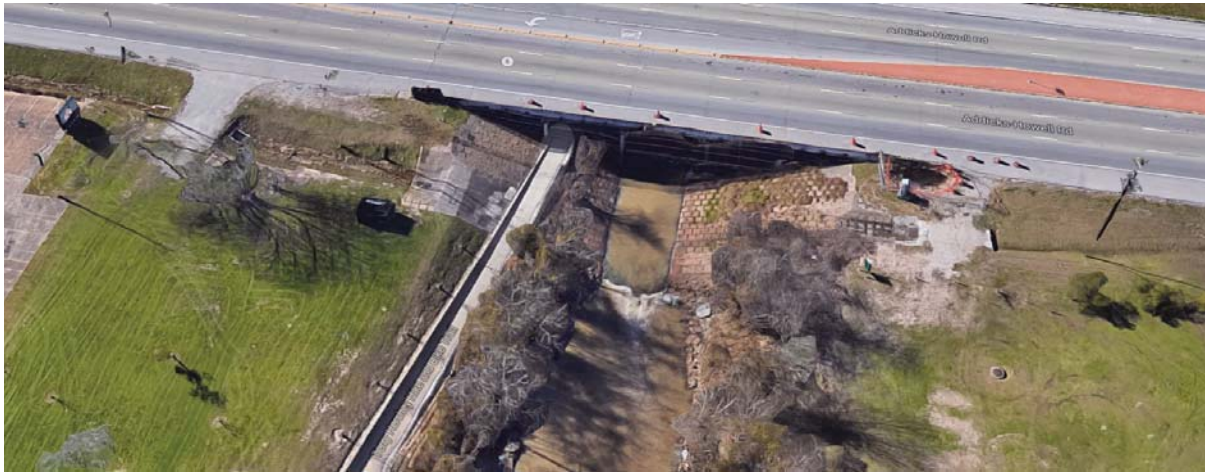


Figure A-4: Aerial view of the east side of Highway 6. Source: Google ©2018 Imagery.

A.1.4 Gate Operation Schedule

Information about gate operations was provided by the US Army Corps of Engineers (Corps) in the form of four spreadsheets. The spreadsheets describe the equations used to calculate flow through the gates depending on the tailwater and headwater conditions:

1. Addicks FY2017 Mornreports-1Hr.xlsm (unsubmerged and headwater submerged conditions) [19]
2. Barker FY2017 Mornreports-1Hr.xlsm (unsubmerged and headwater submerged conditions) [18]
3. ADDICKS RATING.xlsx (tailwater submerged conditions) [25]
4. BARKER RATING.xlsx (tailwater submerged conditions) [26]

In each spreadsheet, five gates are used to represent the array of gates in each reservoir. All quantities are in US Standard Units.

An hourly time series of the opening height of each gate is provided in spreadsheets 1 and 2. These time series were used as input into the TELEMAC model to compute flows through each gate.

A.2 Discharge Equations

The equations that calculate the flows through the gates are different for Addicks and for Barker. There are three flow conditions considered:

1. Unsubmerged Flow (no submergence of the headwater or the tailwater)
2. Headwater Submerged Flow (with no tailwater submergence)
3. Tailwater Submerged Flow (with headwater submergence and at partial tailwater submergence)

A.2.1 Addicks Flow Equations

A.2.1.1 Unsubmerged Flow

Equation 1 shows the formula used to calculate the flow rates through the gates during unsubmerged flow according to the 2012 Water Control Manual. The equation is in the form of a typical sharp-crested weir equation (Equation 14-9 in Chow, 1959 [46]) with a calibrated discharge coefficient.

$$Q = C_1 W_G (HW - H_{invert})^{\frac{3}{2}} \quad (1)$$

Where:

Q = Calculated flow rate through a single gate [cfs]

C_1 = Coefficient [-] (2.87)

HW = Headwater elevation [ft above NAVD88]

H_{invert} = Gate invert elevation [ft above NAVD88] (67.5)

W_G = Width of the single gate [ft] (8.0)

A.2.1.2 Headwater Submerged Flow

Equation 2 shows the formula used to calculate the flow rates through the gates during headwater submerged flow, according to the 2012 Water Control Manual. It is a variant of the typical orifice flow equation (Equation 6-42 in Henderson, 1966 [51]) with a calibrated set of discharge coefficients ($C_2/H_o^{C_3}$).

$$Q = \frac{C_2 W_G H_o \sqrt{2g(HW - H_{invert})}}{H_o^{C_3}} \quad (2)$$

Where:

Q = Calculated flow rate through a single gate [cfs]

C_2 = Coefficient [-] (0.7292311)

C_3 = Coefficient [-] (0.07988726)

W_G = Width of the single gate [ft] (8.0)

$$Q = \frac{C_2 W_G H_o \sqrt{2g(HW - H_{invert})}}{H_o^{C_3}} \quad (2)$$

H_o = Height of the gate opening [ft above invert] (0-6)

HW = Headwater elevation [ft above NAVD88]

H_{invert} = Gate invert elevation [ft above NAVD88] (67.5)

g = Gravitational constant [ft/s²] (32.2)

A.2.1.3 Tailwater Submerged Flow

Tailwater submerged flow occurs when the headwater is submerged and the tailwater reaches at least as high as 67% of the gate opening height. Equation 3 shows the submerged orifice equation, also a variation of the standard orifice equation, calibrated to the gates.

$$Q = W_G H_G \sqrt{\frac{2g(HW - TW)}{C_L}} \quad (3)$$

$$C_L = C_f + C_o + C_{entrance} + C_{exit} \quad (3a)$$

$$C_f = \frac{L_G}{\left(\frac{4W_G H_G}{2W_G + 2H_G}\right)} \quad (3b)$$

$$C_o = \text{fun}\left(\frac{H_o}{H_G}\right) \quad (3c)$$

Where:

Q = Calculated flow rate through a single gate [cfs]

C_L = Loss coefficient [-]

C_f = Friction loss coefficient [-]

C_o = Orifice loss coefficient [-] (See Lookup Tables)

$C_{entrance}$ = Entrance loss coefficient [-] (0.82)

C_{exit} = Exit loss coefficient [-] (1.0)

W_G = Width of the single gate [ft] (8.0)

L_G = Length of the conduit through the gate [ft] (252.0)

$$Q = W_G H_G \sqrt{\frac{2g(HW - TW)}{C_L}} \quad (3)$$

H_G = Maximum height of the gate opening [ft above invert] (6.0)

H_O = Height of the gate opening [ft above invert] (0-6)

HW = Headwater elevation [ft above NAVD88]

TW = Tailwater elevation [ft above NAVD88]

g = Gravitational constant [ft/s²] (32.2)

A.2.2 Barker Flow Equations

A.2.2.1 Unsubmerged Flow

Equation 1 with the following constants:

C_1 = Coefficient [-] (3.1)

H_{invert} = Gate invert elevation [ft above NAVD88] (70.2)

A.2.2.2 Headwater Submerged Flow

Equation 2 with the following constants:

C_2 = Coefficient [-] (0.7249552)

C_3 = Coefficient [-] (0.0898556)

W_G = Width of the single gate [ft] (9.0)

H_O = Height of the gate opening [ft above invert] [0-7]

H_{invert} = Gate invert elevation [ft above NAVD88] (70.2)

A.2.2.3 Tailwater Submerged Flow

Tailwater submerged flow occurs when the headwater is submerged and the tailwater reaches at least as high as 67% of the gate opening height. Equation 4 shows the standard form of the typical orifice flow equation with a calibrated discharge coefficient.

$$Q = C_D W_G H_O \sqrt{2g(HW - TW)} \quad (4)$$

$$C_D = fun(H_O) \quad (4a)$$

Where:

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$$Q = C_D W_G H_O \sqrt{2g(HW - TW)} \quad (4)$$

Q = Calculated flow rate through a single gate [cfs]

C_D = Discharge coefficient [-] (See Lookup Tables)

W_G = Width of the single gate [ft] (9.0)

H_O = Height of the gate opening [ft above invert] (0-7)

HW = Headwater elevation [ft above NAVD88]

TW = Tailwater elevation [ft above NAVD88]

g = Gravitational constant [ft/s²] (32.2)

A.2.3 Lookup Tables

Lookup Tables for the C_O and the C_D parameters were extracted from the spreadsheets provided by the Corps.

Table 8: Lookup Tables

Addicks Gate Opening Ratio [-]	Orifice Loss Coefficient C_O [-]	Barker Gate Opening Ratio [-]	Discharge Coefficient C_D [-]
0	140	0	0.7606
1/6	56.45	0.014285714	0.7536
2/6	10.335	0.028571429	0.7466
3/6	5.766	0.042857143	0.7396
4/6	2.52	0.057142857	0.7326
5/6	0.915	0.071428571	0.7256
6/6	0	0.085714286	0.7186
		0.1	0.7116
		0.114285714	0.7046
		0.128571429	0.6976
		0.142857143	0.6906
		0.157142857	0.68707
		0.171428571	0.68354
		0.185714286	0.68001

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Addicks Gate Opening Ratio [-]	Orifice Loss Coefficient C_o [-]	Barker Gate Opening Ratio [-]	Discharge Coefficient C_D [-]
		0.2	0.67648
		0.214285714	0.67295
		0.228571429	0.66942
		0.242857143	0.66589
		0.257142857	0.66236
		0.271428571	0.65883
		0.285714286	0.6553
		0.3	0.65354
		0.314285714	0.65178
		0.328571429	0.65002
		0.342857143	0.64826
		0.357142857	0.6465
		0.371428571	0.64474
		0.385714286	0.64298
		0.4	0.64122
		0.414285714	0.63946
		0.428571429	0.6377
		0.442857143	0.63689
		0.457142857	0.63608
		0.471428571	0.63527
		0.485714286	0.63446
		0.5	0.63365
		0.514285714	0.63284
		0.528571429	0.63203
		0.542857143	0.63122
		0.557142857	0.63041
		0.571428571	0.6296

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Addicks Gate Opening Ratio [-]	Orifice Loss Coefficient C_o [-]	Barker Gate Opening Ratio [-]	Discharge Coefficient C_D [-]
		0.585714286	0.62865
		0.6	0.6277
		0.614285714	0.62675
		0.628571429	0.6258
		0.642857143	0.62485
		0.657142857	0.6239
		0.671428571	0.62295
		0.685714286	0.622
		0.7	0.62105
		0.714285714	0.6201
		0.728571429	0.6196
		0.742857143	0.6191
		0.757142857	0.6186
		0.771428571	0.6181
		0.785714286	0.6176
		0.8	0.6171
		0.814285714	0.6166
		0.828571429	0.6161
		0.842857143	0.6156
		0.857142857	0.6151
		0.871428571	0.61495
		0.885714286	0.6148
		0.9	0.61465
		0.914285714	0.6145
		0.928571429	0.61435
		0.942857143	0.6142
		0.957142857	0.61405

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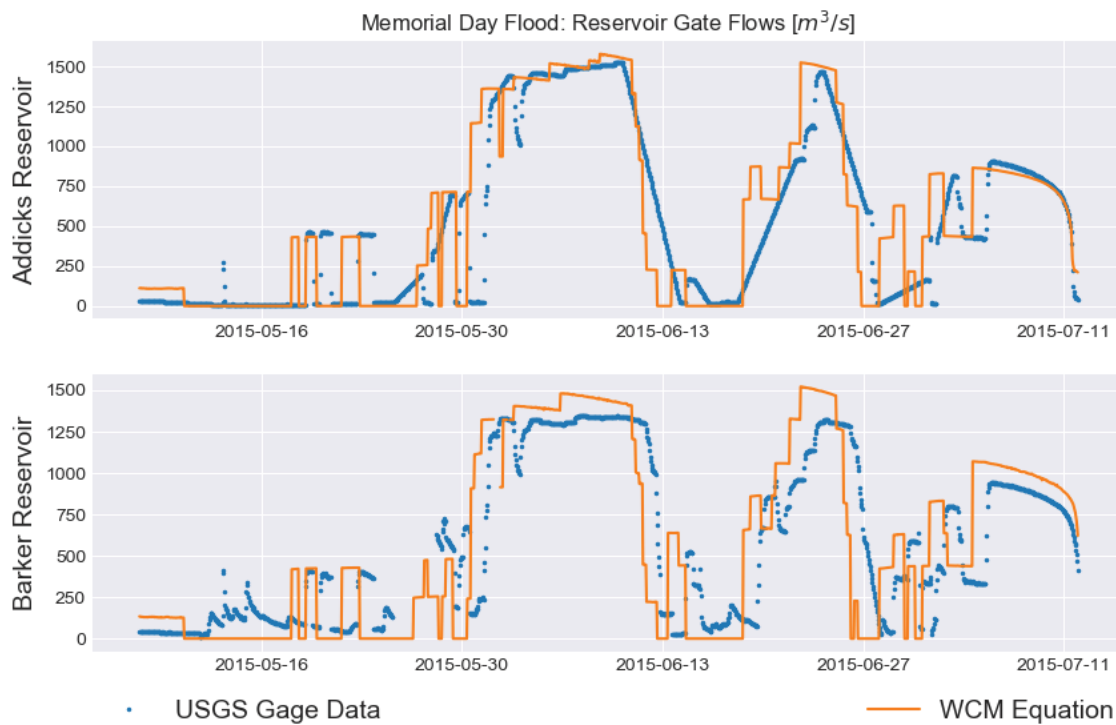
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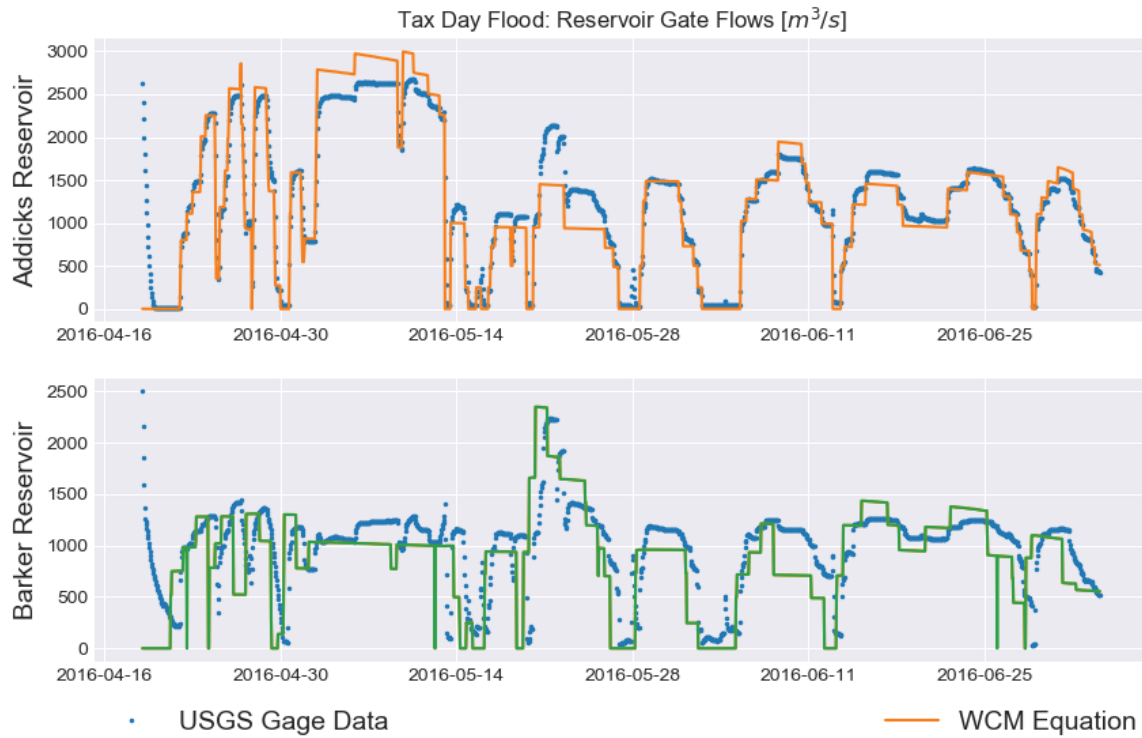
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Addicks Gate Opening Ratio [-]	Orifice Loss Coefficient C_o [-]	Barker Gate Opening Ratio [-]	Discharge Coefficient C_D [-]
		0.971428571	0.6139
		0.985714286	0.61375
		1	0.6136

A.2.4 Gate Flow Calculations

The 2012 WCM flow equation was tested for the Memorial Day (2015) and Tax Day (2016) floods, where no tailwater submergence occurred. The results are shown below.





Appendix B

Dr. Rob Nairn CV Expert Witness Experience and Compensation

B.1 Dr. Rob Nairn CV

B.1.1 Profile

Dr. Nairn is a recognized river and coastal engineering expert with 35 years' experience on hydrodynamics, sediment transport and scour processes in watersheds, rivers, estuaries, lakes, coasts and oceans. Dr. Nairn is responsible for a range of coastal zone planning, management and engineering investigations, numerical and physical modelling and design projects. He is a Principal of Baird & Associates. Dr. Nairn has managed many of Baird's international projects in the Middle East, the Caribbean, Central and South America, Africa, Asia and Europe.

B.1.2 Education

- Ph.D. in Coastal Processes and Engineering Imperial College of Science, Technology and Medicine, London, England
- M.Sc. (Research) in Coastal Engineering, Queen's University, Kingston, Ontario
- B.Sc. First Class Honours in Civil Engineering, Queen's University, Kingston, Ontario

B.1.3 Professional Affiliations

- Registered Professional Engineer, Professional Engineers of Ontario (PEO)
- Associate Member, Canadian Society of Civil Engineering (CSCE)
- Associate Member, Ontario Society of Professional Engineers (OSPE)
- American Shore and Beach Preservation Association
- Canadian Coastal Science and Engineering Association
- Central Dredging Association (CEDA)

B.1.4 Experience

Mid Breton Sediment Diversion Southeast Louisiana (2018-present)

Dr. Nairn is the Hydraulic Engineering Lead on this project and Baird's senior technical reviewer. The project involves the design of a 35,000 cfs diversion from the Lower Mississippi River below New Orleans into Breton Sound. The diversion will bisect the river and back levee system to deliver sediment to restore wetlands and build land within Breton Sound. Dr. Nairn is leading Baird's efforts on the design of this \$650 million restoration project. Baird is applying a wide range of numerical models on the project to evaluate the performance of the diversion in terms of flow conveyance and sediment delivery and to support design development of the inlet, gates, conveyance channel and outfall. Baird's activities under Dr. Nairn's direction include planning of fieldwork and analysis of field data including ADCP data, LISST and turbidity data, water samples, bed samples and multi-beam surveys to evaluate flows, bed and suspended load transport. Dr. Nairn is also leading Baird's team in the application of a wide range of numerical models including HECRAS, MIKE21, FLOW3D, Delft3D, TELEMAC, ADCIRC and our in-house 3D model, MISED. The modelling also includes an evaluation of storm surge impacts from hurricanes on the Gulf Coast.

Lower Churchill River and Melville Lake Mercury Contamination Lower Churchill River, Newfoundland (2018)

Dr. Nairn is the Baird Senior Technical Advisor for this project to evaluate the impact of methyl mercury transport from the Lower Churchill Falls Dam reservoir into Goose Bay, Lake Melville and the North Atlantic. Dr. Nairn reviewed Baird's data analysis efforts in support of development of input and calibration data for their modelling. Baird modelling under the review of Dr. Nairn included watershed modelling and analysis for all of the watersheds to Goose Bay and Lake Melville and detailed Delft3D modelling of hydrodynamics, salinity, temperature and contaminant transport from the Lower Churchill River into the North Atlantic.

Harmful Algal Bloom Action Plans, New York State Lakes New York (2018-present)

Dr. Nairn is the Baird Senior Technical Advisor for this project to evaluate the cause of harmful algal blooms on 13 New York State lakes and to develop Action Plans for the rehabilitation of these lakes to reduce the risk of future algal blooms. The lakes included several Finger Lakes including Lake George and Lake Champlain. Dr. Nairn had overall responsibility for Baird's role in reviewing watershed, river and lake data on flows, sediment and nutrient transport into the thirteen lakes. A wide range of numerical models of watershed, river and lake processes for the thirteen lakes and their respective watersheds were reviewed. Baird also completed extensive remote sensing analysis of watershed and lake conditions including Chlorophyll a mapping to evaluate algal blooms on the lakes. Dr. Nairn coordinated Baird's contributions to action plans for restoration of the lakes and their respective watersheds to reduce the risk of future harmful algal blooms.

Flooding of New York City Buildings During Hurricane Sandy New York (2017-present)

Baird and Dr. Nairn have been retained to review numerical modelling of flood inundation associated with expert witness testimony for this confidential client. The modelling includes overland flow due to storm surge and flow into a series of interconnect basements over a City block. The review includes both an assessment of the model inputs, outputs and assumptions and comparison to data collected during the event. Under Dr. Nairn's direction Baird also completed independent modelling of the inundation of the buildings during Hurricane Sandy.

East Sandusky Bay Wetland Restoration Project and Sandusky Bay Restoration Plan Sandusky, Ohio (2017-present)

Dr. Nairn is the Baird Senior Technical Advisor for this project to restore wetlands to East Sandusky Bay. Baird are a subconsultant to this City of Sandusky project funded by the Ohio DNR. Baird's role includes characterization of the hydrologic, hydrodynamic and sedimentologic processes that are relevant to both the historic disappearance and restoration of the Putnam Marsh complex. Baird are undertaking field work, numerical model of the watershed and bay, contribution to concept development and development of design documents for the solution. Dr. Nairn was also the senior technical reviewer at Baird for a second project on Sandusky Bay involving the development of a strategic restoration plan for the Lower Sandusky River and Sandusky Bay involving the beneficial use of sediment to restore wetlands to the wide bay area to trap sediment and nutrients before they reach the western basin of Lake Erie.

Fox River PCB Contamination, Wisconsin Fox River, Wisconsin (2015-2017)

Dr. Nairn was retained as a rebuttal expert witness in this litigation involving PCB contamination of the Fox River. In this role Dr. Nairn reviewed previous reports on the modelling of hydrologic, hydrodynamic, sediment transport and contaminant transport processes over a 60-year period dating back the 1950s. Dr. Nairn also reviewed a wide range of data reports and analyses in support of the evaluation of PCB fate and transport. Dr. Nairn managed a team of scientists and modelers at Baird in the testing and simulation of fate and transport processes on the Fox River.

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Under Armour World Headquarters Baltimore Harbor, Maryland (2015-2017)

Dr. Nairn was the Baird Principal in Charge and senior technical reviewer for all hydrologic and coastal engineering related to the development of Under Armour's new 50-acre global headquarters at Port Covington in Baltimore Harbor, Maryland. The project included analysis and design of several new waterfront elements including a 1000 ft long marginal wharf, a 2000 ft long living shoreline, a 3-acre man-made lake, a new cooling water intake, and a bio-weir outfall structure. Baird was responsible for technical analyses to support design of all waterfront elements including assessment of flood risk due to hurricane generated storm surge, wave runup and overtopping, as well as potential future sea level rise. Baird provided recommendations for building first floor elevations, wharf deck elevations, and shore protection crest elevations. Baird was also responsible for the design of a cooling water system including modeling and compliance analyses of the intake structure, a three-acre manmade lake for initial cooling, and two thermal discharge structures.

Bayou Lafourche Pump Station and Diversion Donaldsonville, Lower Mississippi River (2016-present)

Dr. Nairn is the Baird Project Manager for this project to increase the pump station capacity that supplies water from the Mississippi River to Bayou Lafourche. Baird's role on the project consist of water and sediment management on the river and bayou sides of the project. Baird has coordinated field surveys including ADCP, turbidity gages, bed and water sediment sampling and bathymetry. A 3D hydrodynamic, sediment transport and morphologic model of the river was developed and applied and linked to a HECRAS model of the bayou to support evaluation of different alternatives for sediment and debris management in the river and on the bayou.

Javits Center Expansion – Flood Dynamics Modeling New York City (2016)

Dr. Nairn was the Baird Principal in Charge and senior technical reviewer on this project to investigate potential impacts of the proposed expansion of the Javits Center, located on 12th Avenue in New York City, on flood dynamics around its neighboring Lincoln Tunnel Ventilation Building. Baird was retained to assess the impact that the Center's new annex would have on flood levels at the ventilation building and conducted flood simulations to simulate overland flood flow at the site including inundations associated with the 10-, 50-, 100-, and 500-year flood events for both the existing and post-expansion conditions, the latter under various future sea level rise scenarios.

Changing Course Design Competition Possible Re-Alignment of the Lower Mississippi River (2014-2016)

In September 2014 Baird was selected as a winning team among 21 global competitors in the Changing Course Design Competition. Dr. Nairn was the Baird Team leader and of an inter-disciplinary team of 25 leading regional and national specialists (including areas of delta and barrier island geomorphology, sea level rise and subsidence, estuarine processes, wetlands/marsh building, fisheries, oysters, navigation, flood risk reduction and socio-economic factors) in the development of innovative solutions to the land loss problem in the Mississippi River delta associated with re-alignment of the river mouth. The team's work included a wide range of analysis including numerical modeling of river flooding, storm surge, hydrodynamics, estuarine salinity, sediment transport and delta building, and navigation simulations. Detailed reviews of marsh building and oyster reef restoration were also considered in the development of the solution.

Coastal Risk Assessment and Management Program Barbados (2015-2016)

Dr. Nairn was the lead technical reviewer of a sediment transport study to assess seal level rise impacts on beaches around Barbados as part of the Coastal Risk Assessment and Management Program. The study involved an island-wide assessment of underwater habitat conditions in relation to carbonate sediment production potential providing the natural supply of beach material. A multi component beach sediment budget prediction model was developed that formulates the

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balance between supply and loss of sediment for individual beaches under future sea level rise scenarios. The model will serve as a management tool for the Coastal Zone Management Unit to understand trends and risks, highlight key future issues/challenges, and support beach management actions over a planning horizon of 50 to 100 years.

La Pastora Riverbank Protection Puerto Moldanado, Peru (2015-2017)

Dr. Naim was the Principal in Charge and senior technical reviewer for Baird's design of this river bank protection project to protect a highway in Peru. Severe riverbank erosion was threatening a primary highway at a bend in the La Pastora River in Puerto Moldanado, Peru. Baird was responsible for design development on this \$30 million design-build project consisting of 12 steel sheet pile bendway weirs protecting 1.5 km of river bank, completed in 2017. Baird's activities under Dr. Naim's oversight included review of physical modeling of the protection system, management of field measurements of flows and bathymetric change and 3D numerical modeling of hydrodynamics, sediment transport and morphodynamics, all in support of design development.

Duqm Port Basin Channel Sedimentation Assessment Duqm, Oman (2015-2016)

Dr. Naim was the Principal in Charge and senior technical reviewer for this assessment of channel sedimentation at the new port of Duqm on the Indian Ocean. The project involves extensive fieldwork under the direction of Baird and hydrodynamic/morphologic numerical modeling of sedimentation processes.

Kalamazoo River Superfund Site Investigations Kalamazoo River, MI, USA (2014-2015)

Dr. Naim was the lead expert witness for the development and application of PCB Fate and Transport model including watershed, hydrodynamic, sediment transport/morphologic change and water quality components (with SWAT and Delft3D). The model was developed, calibrated and validated to develop a hindcast of conditions including discharges from fourteen paper mills for 80 miles of the Kalamazoo River between 1954 and 2014. Baird's work also included: field investigations of river hydrodynamics and bed sediment conditions.

Capers Ridge Pumping Station for the Luce Bayou Interbasin Transfer Project Trinity River, Texas (2012-2015)

Dr. Naim was the Principal-in-Charge and senior technical reviewer for Baird's role on this project to transfer water from the Trinity River westwards towards Houston in Texas. The Capers Ridge Pump Station of the Texas Coastal Water Authority features a 240 MGD capacity to transfer freshwater and goes to construction in 2016. Baird worked initially as a subcontractor to AECOM in the successful completion of the Environmental Impact Statement and more recently as a subcontractor in the Final Design stage to Dannenbaum/Black and Veatch. Baird completed detailed geomorphic analysis through site reconnaissance and GIS-based air photo analysis, in addition to 3D numerical modelling of river hydrodynamics, sediment transport and morphologic change to support the environmental impact assessment and final design and to evaluate potential impacts to flooding. Baird also supported the design of bank and toe protection for the intake.

Evaluation of Sediment Stability at a Superfund Site for National Grid Gowanus Canal, Brooklyn, NY, USA (2011-present)

Dr. Naim is the Principal in Charge and senior technical reviewer for an evaluation of sediment stability in an industrial canal in Brooklyn. Baird's work includes coordination of field work including bathymetry survey, erodibility sample acquisition and testing, ADCP measurements, sediment samples, and suspended sediment sampling. In support of this project Baird is also responsible for an evaluation of barge traffic and barge traffic impacts, numerical modeling of hydrodynamics, sediment transport and morphologic change using Delft3D.

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Pier IV Development for Vale Sao Luis, Brazil (2010-2016)

Dr. Nairn was the Senior Technical Advisor for the evaluation of hydrodynamics sedimentation, scour and underwater slope stability issues associated with this \$1.7B iron export facility expansion by Vale in northern Brazil. Baird coordinated comprehensive field programs including bathymetry surveys, geophysical surveys, ADCP measurements, suspended sediment sampling, seabed sediment sampling and boreholes. Baird has completed extensive modeling of hydrodynamics, sediment transport and morphological change using our in-house model MISED to evaluate capital and maintenance dredging requirements for sediment traps and berthing areas for Valemax class vessels (400,000 DWT).

Harbour Improvements to address Sedimentation, Erosion and Wave Agitation Al Ashkarah and Quriyat Harbours, Oman (2012-2015)

Dr. Nairn was the Baird Principal in Charge and senior technical reviewer for the evaluation of sedimentation, erosion and wave agitation problems and design of remedial measures at these two existing fishery harbours in Oman. Baird coordinated a comprehensive field program including bathymetry survey, meteorological monitoring, ADCP measurements of waves and currents, tide measurements, sediment sampling, jet probing and boreholes. This information is supporting numerical modeling of waves, currents, sediment transport and morphological change using our in-house model HYDROSED to understand the problem and develop solutions. Solutions were evaluated in a physical model. The selected solution for Quriyat consists of a 385 m extension of the south breakwater, with over 250,000 tonnes of stone and over 4,000 Accropode II™ concrete armor units (from 5.0 m³ units along the trunk and 7.5 m³ units at the head).

Rio Cruces Estuary, Evaluation of Large Scale Changes in Aquatic Vegetation Valdivia, Chile (2007-2012)

Dr. Nairn was the Baird Project Manager for the evaluation of the disappearance of submerged aquatic vegetation and the sedimentation of this 40 km long estuary in Chile. The investigation included a comprehensive field investigation consisting of over 100 sediment cores, radionuclide dating, laser particle analysis, bio-indicator analysis and testing for metals; ADCP, turbidity, TSS and water level measurements. This field information was combined with a hydrodynamic and sediment transport model to investigate the role of point and non-point source loading on a nutrient and sediment balance of the estuary. Since the largest earthquake ever recorded caused 2 m of subsidence to create this estuary, the estuary has filled with sediment leading to rapid succession in vegetation communities.

Evaluation of Requirement for North Breakwater Port of Salalah, Oman (2012-2014)

Dr. Nairn was the Project Manager for the evaluation mooring problems associated with this container terminal port in southern Oman. The primary problem relates to long waves (periods greater than 120s) and reflection of long waves from a beach into the port. Baird's assignment is to evaluate the need for a \$250 million north breakwater to prevent long waves from disrupting mooring operations in the port and to optimize the layout of the breakwater. Baird is also responsible for and EIA for the new breakwater. Tasks include bathymetry survey, extensive analysis of existing wave and ship motion data, numerical modeling of long waves using XBEACH and ship motion for various port layout alternatives. The EIA task includes an evaluation of water quality impacts of the proposed breakwater and erosion and sedimentation impacts of the breakwater.

Brice Lagoon Remediation Saudi Arabia (2012-2013)

Baird & Associates were retained to apply a hydrodynamic model (MIKE21) and develop design for the restoration of Brice Lagoon on the Gulf coast of Saudi Arabia. Dr. Nairn was the Project Manager for this work. Baird completed fieldwork, GIS analysis and numerical modeling to develop the design to restore this coastal lagoon. Restoration included re-opening the lagoon to the sea, removal of oil and re-creation of tidal channels through the lagoon. The numerical model was used to

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evaluate the required opening for the gate structure at the inlet to the lagoon, in addition to the configuration and dimensions of internal tidal channels. This \$34 million restoration project was completed in 2013.

Yanbu Industrial Outfalls Saudi Arabia (2011-2013)

Baird & Associates were retained by local environmental consultants in Saudi Arabia to develop, test and implement a 3D hydrodynamic and water quality model to evaluate the expansion of industrial and domestic wastewater treatment plants (two separate projects) for the Industrial City of Yanbu on the Red Sea. Dr. Nairn was the Principal-in-Charge on this project for Baird. Work included model development, calibration/validation against existing data and modeling of future scenarios. The purpose of the work was to support Environmental Impact Assessments for the treatment plan expansions.

Port Hedland Outer Harbour Development Port Hedland, Western Australia (2010-2013)

Dr. Nairn was the Technical Director of sediment transport studies conducted in support of the design of a new offshore terminal for the export of iron ore. The vessels to be accommodated in the facility ranged in size from 150,000 to 250,000 DWT. Overall responsibilities included review of meteorological and oceanographic characterization; dredged basin layout; dredged depth design for a 32 km channel and basin; and estimates of maintenance dredging requirements. Baird applied our in-house model MISED to evaluate hydrodynamics, sediment transport and morphologic change and completed reviews of DELFT3D modeling by others.

Farim Phosphate Marine Terminal Development Guinea Bissau (2012-present)

Dr. Nairn is the Baird Principal in Charge and senior technical reviewer for the development of marine facilities options for this new mine development in Guinea Bissau, West Africa. Baird's work included development of design to provided bankable feasibility level cost estimates for capital and maintenance costs for all marine facilities and operations to export the mineral product. Tasks included coordination of comprehensive field programs including: bathymetry survey, geophysical survey, seabed sediment sampling ADCP measurements of waves and currents and tide measurements. Baird completed numerical modeling of hydrodynamics and sediment transport using our in-house model MISED. Baird developed design for an export pier and design for 100 to 200 km long channels including capital and operational cost estimates. Baird evaluated shipping options for export.

Cotonou Sea Defence Project Benin, West Africa (2000-2003, 2008-2012)

Dr. Nairn was the Project Manager for the completion of a Final Design Report, drawings, specifications, bill of quantities and an Environmental Assessment Report for this USD100 million sea defence project. The project consisted of eight large headland structures with over 600,000 tonnes of rock and almost 700,000 m³ of beachfill to protect 7 km of severely eroding shoreline. Another aspect of the project was addressing a 300,000 m³/year-sedimentation problem at the deep draft Port of Cotonou. Baird was responsible for all aspects of design on this Design-Build project. Investigations included topographic and hydrographic surveying, geotechnical and quarry investigations and numerical modeling of waves, currents, sand transport, sedimentation and shoreline change. In 2008, Baird & Associates were retained to take the lead role in developing tender documents for this project and to participate in the engineering services during construction.

Don River Mouth Restoration and Port Lands Flood Protection Toronto and Region Conservation Authority, Canada (2006-2015)

The naturalization of the Don River Mouth in downtown Toronto seeks to restore some of the natural functions of the river mouth at the same time as improving flood protection. Baird is a key part of the team undertaking the environmental assessment and functional design for naturalizing the Don and addressing flooding in the Port Lands. Baird's role is to

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assess the physical processes of sediment/debris transport and deposition under the existing conditions and for a series of proposed alternatives using Delft 3D. This assessment includes sediment trap analysis and evaluation of dredging options, assessment of sediment transport and deposition in different naturalized channel alternatives, and participation in the design and public consultation process. Dr. Nairn is the Baird Principal-in-charge for the sediment transport analysis and modelling, and an active participant in the Individual EA process.

Development of Watershed Based Sediment Transport Management Systems Detroit District US Army Corps of Engineers, (1999-2014)

Dr. Nairn was the Principal-in-Charge for the development and implementation of several watersheds based hydrologic, hydrodynamic and sediment transport modeling systems using GIS as a framework. Baird was responsible for developing, implementing and testing models for the Saginaw R. in Michigan, the Menomonee R. in Milwaukee, the Clinton River near Detroit and the Nemadji R. at Duluth. For these four watersheds Baird delivered final reports and user manuals and completed training workshops for local users of the systems. Under Dr. Nairn's direction Baird is developing similar systems on seven other watersheds, rivers and receiving waters in Michigan and Ohio. Baird's overall fees on these projects exceed USD2.5 million.

Jeddah Region Coastal Water and Sediment Quality Assessment and Remediation Project Jeddah, Saudi Arabia (2007-2011)

Dr. Nairn was the Baird Project Manager for this comprehensive assessment of water and sediment quality along a 75 km reach of Red Sea coast centered on Jeddah. The investigations included water and sediment quality sampling, hydrographic surveys, measurements of waves and currents, use of bio-indicators and stable isotope analysis, 3D numerical modeling of hydrodynamics and sediment transport, and evaluation of remedial alternatives. A plan for the implementation of remedial measures was developed.

Evaluation of Harbor Impacts on Downdrift Shoreline Erosion St. Joseph Harbor, Lake Michigan, USA (2004-2011)

Dr. Nairn was the Project Manager for this comprehensive assessment of the impacts of St. Joseph Harbor on adjacent shoreline erosion processes. The work was completed to develop expert witness testimony for a trial in the Federal Court of Claims in the USA. Dr. Nairn was the lead technical expert in both the 2007 and 2011 trials for the US Dept. of Justice. Baird's work included a thorough investigation of the history of erosion processes since harbour construction in 1836. Specific tasks included shoreline change analysis (accretion in the fillet beaches and erosion of adjacent shores) using GIS, evaluation of navigation channel dredging, evaluation of the beach nourishment mitigation program, numerical modeling of changes to watershed supply of sediment, numerical modeling of wave climate, wave transformation, hydrodynamic, longshore sediment transport and harbor bypassing, consideration of cohesive and sandy shore erosion processes and development of a comprehensive sediment budget for several periods between 1836 and present.

St. Clair River Investigation Great Lakes Basin (2004-2011)

Dr. Nairn was the Principal-in-Charge for this assessment of reduction in head difference between Lakes Huron-Michigan and Lake St. Clair/Erie. The project discovered an ongoing drop in the base level of Lakes Michigan-Huron and found that this was primarily explained by erosion of the riverbed of the upper St. Clair River. The project involved numerical modeling, GIS analysis from Lake Huron through to Lake Erie.

Breakwater Damage and Repair Assessment Sohar Industrial Port Complex, Oman (2011-2012)

Dr. Nairn was the project manager for a comprehensive assessment of cyclone damage to 6 km of breakwaters protecting a large port in Oman. The study included detailed, high resolution laser and multibeam sonar surveys of the above and below

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water portions of the breakwater, assessment/quantification of damage to the armour layer caused by a tropical cyclone, and preliminary design development for remedial works. Dr. Nairn managed the study team during the planning and implementation of the field study, and throughout the data reduction/analysis phase.

Sedimentation Assessment for a new Port in Guinea Guinea, West Africa (2007-2008)

Dr. Nairn was the internal technical director of numerical modeling of sediment transport and channel sedimentation processes for this new deep draft port and proposed 25 km long navigation channel. The project including coordination of field investigations to measure waves and currents and direct fieldwork to retrieve cores, sea bed sediment samples and suspended sediment samples. The numerical modeling consisted of the application of a hydrodynamic, sediment transport and morphologic model to predict short and long-term sedimentation along the full length of this channel the extends from offshore into the estuary of two large rivers.

IJC Lake Ontario and St. Lawrence River Review of Regulation Plans International Joint Commission, Lake Ontario (2001-2005)

Dr. Nairn was the Baird Principal-in-charge for a lakewide assessment of erosion and flooding hazards and impacts to support the current International Joint Commission review of regulation plans for controlling the outflow from Lake Ontario. This 3-year project involved data collection, numerical modeling, economic and GIS analysis on a lakewide scale covering thousands of kilometers to determine impacts of different lake level regulation plans over a 50-year planning horizon. Baird developed customized software, integrating erosion and flood prediction models with economic damage models within a GIS framework, to complete this task.

Morphodynamics of Dredged Pits – Biological and Physical Impacts Gulf of Mexico, US Minerals Management Service (2005-2009)

Dr. Nairn was the Project Manager for the assessment of infilling of dredged pits along the Gulf of Mexico and Atlantic coasts of the USA. Coastal restoration projects associated with long-term plans and in response to the damage associated with Hurricanes Rita and Katrina require a source of beachfill quality sediment. The purpose of this study is to evaluate pit morphology (pit infilling and pit margin erosion) and the associated biological and physical impacts. The study includes field surveys of an existing pit (sediment samples and cores, benthos sampling, ADCP measurements, hydrographic survey, water quality measurements including temperature, salinity and suspended sediment) and 3D numerical modeling of pit infilling with time. The study resulted in guidelines for the regulation and management of sand and gravel resources along the US coast.

Barbados Coastal Infrastructure Project Barbados, West Indies (2002-2011)

Dr. Nairn was the project manager for the design phase of one of the largest of eight waterfront rehabilitation projects Baird designed. The award winning USD8 million Rockley Beach project consists of beach restoration through the construction of natural headlands and beach nourishment to improve coastal resilience and public access. In addition, Dr. Nairn provides technical advice to the Coastal Zone Management Unit in Barbados on an ongoing basis related to the linkage between point and non-point source (water/ground watershed), marine water quality, reef health and the link to long-term beach stability. These various studies were based on extensive field investigations, numerical modeling of waves (including hurricanes), surge, currents and sand transport.

Port D'Ehoala, Fort Dauphin Madagascar (2003-2010, 2011-2015)

Dr. Nairn provided Quality Control of sediment transport studies of the new \$150 million port project designed by Baird. The port is located at the south end of Fausse Baie des Galions, which is a large embayment between two natural headlands

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under the action of bi-directional swell and sea waves. Major project components include two berths, dredging and reclamation, berm breakwater, groynes, navigation channel, and quarry development. GIS analysis of historic shorelines and extensive 2D numerical analysis of waves, currents and sediment transport of the bay with and without the port in place were conducted to determine sedimentation rates and countermeasures as well as the effect of port construction on the shape of the bay. Dr. Nairn has been served as a senior technical reviewer of the erosion and sedimentation from Baird's monitoring on the project.

Source Water Protection Initiative, Province of Ontario Ontario, Canada (2006-2011)

Dr. Nairn was the Principal-in-Charge at Baird on seven different projects with over \$1.2M in fees to evaluate the vulnerability of surface water intakes to contamination. The work involves development and application of policy for evaluation of surface water intakes. Numerical modeling has been completed for over 60 surface water intakes to determine the threats and vulnerability from various pollutant sources including rivers, wastewater treatment plant outfalls and spills at ports and harbours.

Cat Island Chain Restoration Green Bay, WI (2003-2013)

Dr. Nairn was the project manager for the conceptual and preliminary design phases of this \$15 million USACE award winning Great Lakes Restoration Initiative project that was completed in 2013. The project consisted of restoring the 270 acre Cat Island chain and creating conditions for the recovery of the 1,400 acre Duck Creek wetland. The innovative approach consisted of creating a skeleton of the Cat Island chain which will be filled through beneficial use of 2 million cubic yards of dredged sediment from the Green Bay navigation channel over the next 20 years. The project featured over 23,000 ft of rubblemound structure comprised of more than 650,000 tons of stone. Tasks included field investigations, numerical and physical modeling of waves and currents, overtopping, sediment plumes and evaluation of historic dredging and sedimentation, achieving survival criteria for aquatic vegetation and natural island design with living shorelines.

Keta Sea Defence Project, Ghana West Africa (1996-2004)

Dr. Nairn was the study manager for the development of an \$80 million sea defence system to protect 7 km of rapidly eroding coastline. The design included seven large headlands (each constructed with approximately 70,000 t of rock), 2,600,000 m³ of beach nourishment and a flood relief structure. Field investigations included boreholes, vibracores, augers, topographic and hydrographic surveys and wave gauge deployment. Design analyses included the application of numerical models of wave transformation, coastal processes, shoreline change, and the completion of physical model tests. The numerical models were applied to simulate wave setup and runup that resulted in severe flooding and overtopping of the barrier island that protects Keta Lagoon. Baird's engineering fees during both design and construction phases of the project totaled \$4,500,000. Construction on the project started in January 2000 and was completed in 2004, on budget and ahead of schedule.

Flood Hazard Review for FEMA Collier County, Florida (2002)

Dr. Nairn managed Baird's input to a review of the hurricane flood zone mapping for Collier County in Florida. Baird was specifically retained by FEMA to determine whether analyses completed to support re-mapping of the flood zone correctly considered the combined influence of storm surge and wave setup along the Collier County coast.

Lake Michigan Potential Damages Study - U.S. Army Corps of Engineers Lake Michigan (1996-2002)

Dr. Nairn was the Baird Principal-in-charge for a six year Corps of Engineers' project to develop a Flood and Erosion Prediction System (FEPS) to quantify flooding, erosion and sediment transport processes, initially along the entire 2400 km coast of Lake Michigan and eventually all the Great Lakes. The FEPS links wave analysis, the COSMOS coastal process model and sediment budget routines to a GIS system (for the purposes of pre and post processing) and provides a valuable coastal zone management tool to assess potential erosion and flooding damages and for planning purposes. The system also provides a regional sand management tool to assess the impact of various forms of waterfront development on sand supply and sedimentation issues. The FEPS is also being applied to Lakes Ontario and Erie.

Elbow Cay – Flood and Erosion Vulnerability Assessment Abaco, Bahamas (1999-2000, 2004-2005)

Dr. Nairn was the study manager for this investigation of flood and erosion processes along the shoreline of Elbow Cay. The investigation was initiated to assess damage caused by Hurricane Floyd and to develop recommendations for remedial measures. Numerical models were applied to assess deepwater and nearshore wave conditions, storm surge, wave generated currents, wave setup, runup and overwash and erosion of the dune face. The predictions were verified with observations of flooding and erosion during Hurricane Floyd. Vulnerability of the shoreline to future hurricanes is presented through direct links between the models and GIS. A follow-up study was completed to assess the impact of Hurricanes Jeanne and Frances in 2004 and to refine the proposed protection options.

Hudson River PCB Assessment New York (2000-2001)

Dr. Nairn was selected to provide expert review on the hydrodynamic and sediment transport aspects of the Baseline Modeling Report completed for the Environmental Protection Agency.

Modeling of Fate and Transport of PCB Contaminated Sediments on the Fox River, WI Wisconsin (1998-2001)

Dr. Nairn was the project manager for the development of a 2D/3D hydrodynamic, fate and transport model to assess resuspension potential for PCB contaminated sediments for the Fox River RI/FS. The project included assessment of the resuspension characteristics of fine sediments using the results of field and laboratory methods. Dr. Nairn also managed the application of GIS to develop 3D maps of contaminant concentration and to display predicted resuspension patterns for remedial alternatives.

Lower Great Lakes Flood and Erosion Study Lake Erie and Ontario (1999-2001)

In 1998, the Buffalo District U.S. Army Corps of Engineers initiated a comprehensive investigation on the US shoreline of Lake Erie and Ontario. Dr. Nairn was the Principal-in-charge on this project that included the application of the Flood and Erosion Prediction System (FEPS) to counties in Ohio and New York State. The FEPS is a custom modeling system developed by Baird to evaluate regional coastal processes, predict long term erosion, impacts of coastal structures (such as harbors), and assessments of regional sediment management.

Sheboygan River, WI (2001-2003, 2005-2006)

Dr. Nairn was the project manager for the 3D numerical model investigation of hydrodynamics and sediment transport on the Sheboygan River to investigate the potential mobilization of PCB bearing sediment. The project was completed for the US Army Corps of Engineers on behalf of EPA. The work included model selection and testing, laboratory experiments to assess erodibility of relatively undisturbed core samples, data gap analysis and subsequent field work and turn over of the modeling system to the client.

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B.1.6 Awards

- Gold Medal in Civil Engineering, 1982 - Queen's University, Kingston, Ontario
- Queen's University Jenkins Trophy for athletic and scholastic achievement
- Unwin Postgraduate Prize in Civil Engineering - Imperial College of Science, Technology and Medicine, London, England

B.2 Previous Expert Witness Experience & Compensation

B.2.1 Previous Expert Witness Experience

Muskegon Conservation Club v. Consumers Energy Co., No. 01-40632 (Michigan 14th Circuit Court) (for Consumers Muskegon River – expert report, deposition and trial testimony)

Banks et al. v. USA, No. No. 99-4451 (Fed. Cl.) – liability phase (for DOJ, expert report at least one deposition and trial testimony)

Banks et al. v. USA, No. No. 99-4451 (Fed. Cl.) – damages phase (for DOJ, three or four expert reports at least one deposition and trial testimony)

Georgia-Pacific Consumer Products LP, et al. v. NCR Corp., et al. No. 11-CV-483 (W.D. Mich.) (Kalamazoo River for NCR – expert report, deposition and trial testimony)

Appvion Inc. and NCR Corp. v. P.H. Glatfelter Co. et al. (Fox River for NCR – expert report and deposition, settlement reached before trial, therefore no testimony)

B.2.2 Compensation

The compensation rate for Dr. Nairn is \$302/hour.

Appendix C

Results of Downstream Hydraulic Study

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C.1 Summary of Results at Downstream Test Plaintiffs

A summary of the results of model runs at the downstream Test Properties is presented below in Tables C-1 and C-2. The following model runs have been considered:

- Actual Harvey Run: Representing actual Harvey-Event conditions upstream and downstream of the dams. Refer to Figures C-1 to C-14.
- No Project Run I: Representing hypothetical conditions without the dams and channel improvements within the GOL. Refer to Figures C-15 to C-28
- No Project Run II: Representing hypothetical conditions without the dams (including channel improvements on GOL).
- Gates Closed Run: Representing actual Harvey Event conditions upstream and downstream of the dams under the hypothetical no reservoir release scenario.
- Gates Open Run: Representing actual Harvey Event conditions upstream and downstream of the dams under the hypothetical gates fully open (maximum release) scenario.
- Historical Runs: Simulating historical rain events under the hypothetical conditions without the dams and channel improvements within the GOL. Refer to Figures C-29 to C-42.

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Table C-1: Summary of Harvey-related run results for Downstream Plaintiffs

Plaintiff	Maximum depth of inundation above FFE (ft)				Duration (hr)			
	Actual Harvey	No Project I*	No Project II**	Gates Open	Actual Harvey	No Project I*	No Project II*	Gates Open
Aldred, Val & Linda	1.5	9.8	9.6	2.9	119	105	88	259
Good Resources, LLC	3.5	12.0	12.1	4.9	248	126	96	320
SMC Investment	4.8	13.5	13.6	6.2	291	153	103	334
Milton, Arnold	4.0	12.5	12.7	5.5	264	139	97	322
Shipos, Jennifer	0.7	9.4	9.4	2.3	34	103	85	190
Hollis, Wayne	3.2	11.5	11.4	4.7	239	126	96	319
Silverman, Peter	1.3	9.3	9.2	2.9	75	115	92	282
Godejord, Strause	2.0	10.0	9.8	3.7	159	116	96	311
Cutts, Paul	0.1	7.6	7.6	2.7	14	99	92	137
Ho, Becky								
Beyoglu, Mahmut	3.0	10.8	10.9	6.0	204	102	103	316
Azar, Phillip	8.5	16.4	16.5	12.2	282	116	113	334
Stahl, Timothy	2.8	10.4	10.5	5.3	17	105	95	73
Welling, Shawn	8.8	15.4	15.3	9.7	59	127	106	116

* No Project Run I is the same run as the No Project Run presented in this report.

** No Project Run II includes channel improvements on GOL and the lower Buffalo Bayou rectification.

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Table C-2: Summary of results of Historical runs at Downstream Plaintiffs

Plaintiff	Maximum depth of inundation (ft)						Duration (hr)					
	2001	2016	1994	2015	2009	1975	2001	2016	1994	2015	2009	1975
Aldred, Val & Linda	0.9	8.2	4.5	-	-	-	21	62	51	-	-	-
Good Resources, LLC	2.0	10.3	6.5	-	-	-	38	75	66	-	-	-
SMC Investment	3.3	11.7	7.9	1.1	-	0.5	57	87	82	38	-	35
Milton, Arnold	2.1	10.8	6.9	0.2	-	0.1	40	82	73	15	-	5
Shipos, Jennifer	-	7.6	3.8	-	-	-	-	57	43	-	-	-
Hollis, Wayne	1.9	9.9	6.3	-	-	-	35	74	64	-	-	-
Silverman, Peter	-	7.4	4.0	-	-	-	-	67	53	-	-	-
Godejord, Strause	-	8.0	4.3	-	-	-	-	68	54	-	-	-
Cutts, Paul	-	5.8	1.4	-	-	-	-	54	31	-	-	-
Ho, Becky										-	-	
Beyoglu, Mahmut	-	9.1	4.0	-	-	-	-	60	35	-	-	-
Azar, Phillip	-	14.5	7.5	-	-	-	-	70	45	-	-	-
Stahl, Timothy	-	7.6	-	2.6	2.6	-	-	55	-	191	120	-
Welling, Shawn	2.3	8.1	1.2	1.4	0.7	1.1	153	106	90	60	-	90

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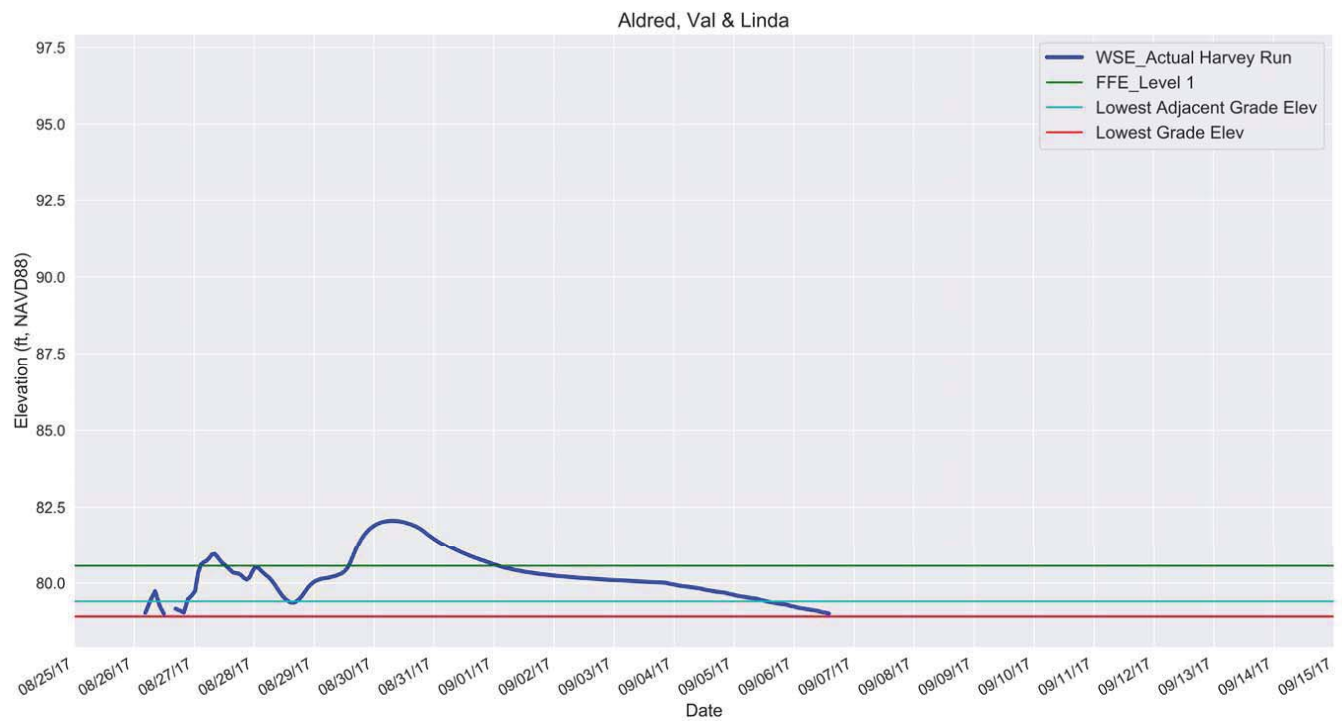


Figure C-1: Simulated water surface elevations at Aldred, Val & Linda (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
82.1	81.0	18"	12" - 18"

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Figure C-2: Simulated water surface elevations at Good Resources, LLC (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
82.0	N/A	41.5"	48 -72"

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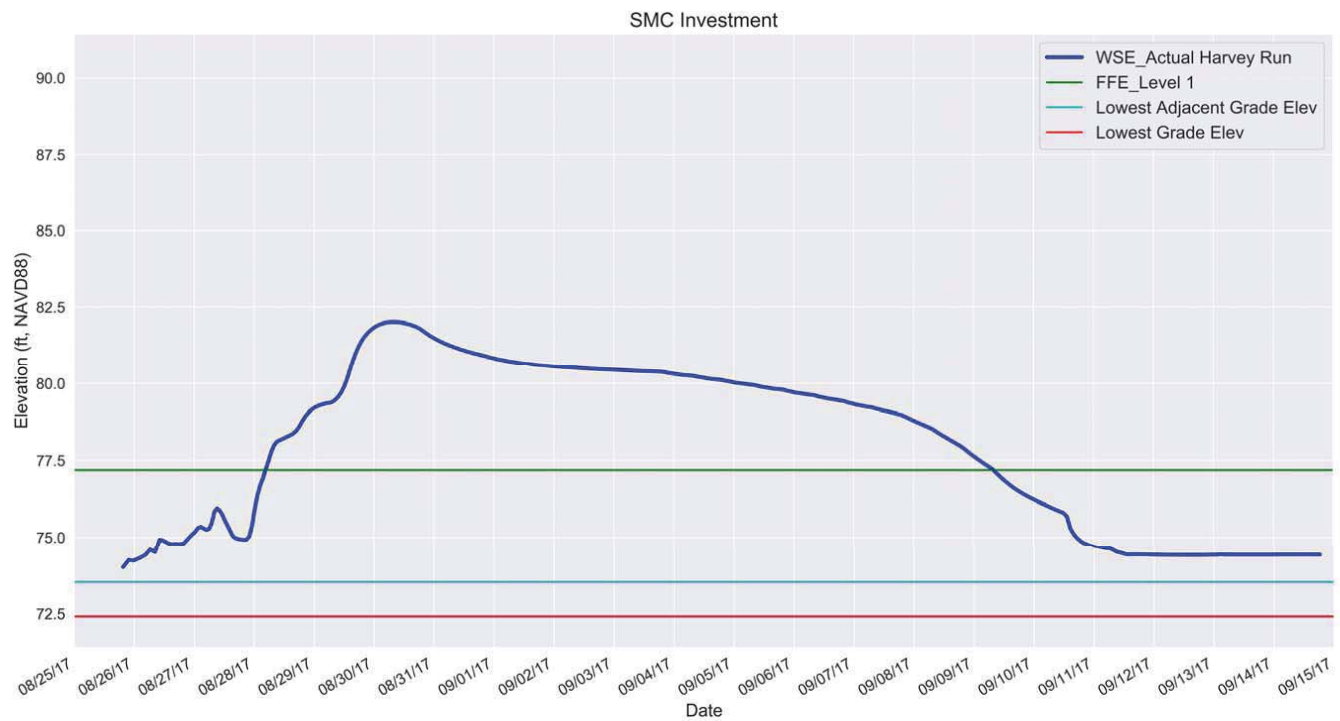


Figure C-3: Simulated water surface elevations at SMC Investment (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
82.0	79.2	4.8 ft	5 plus feet

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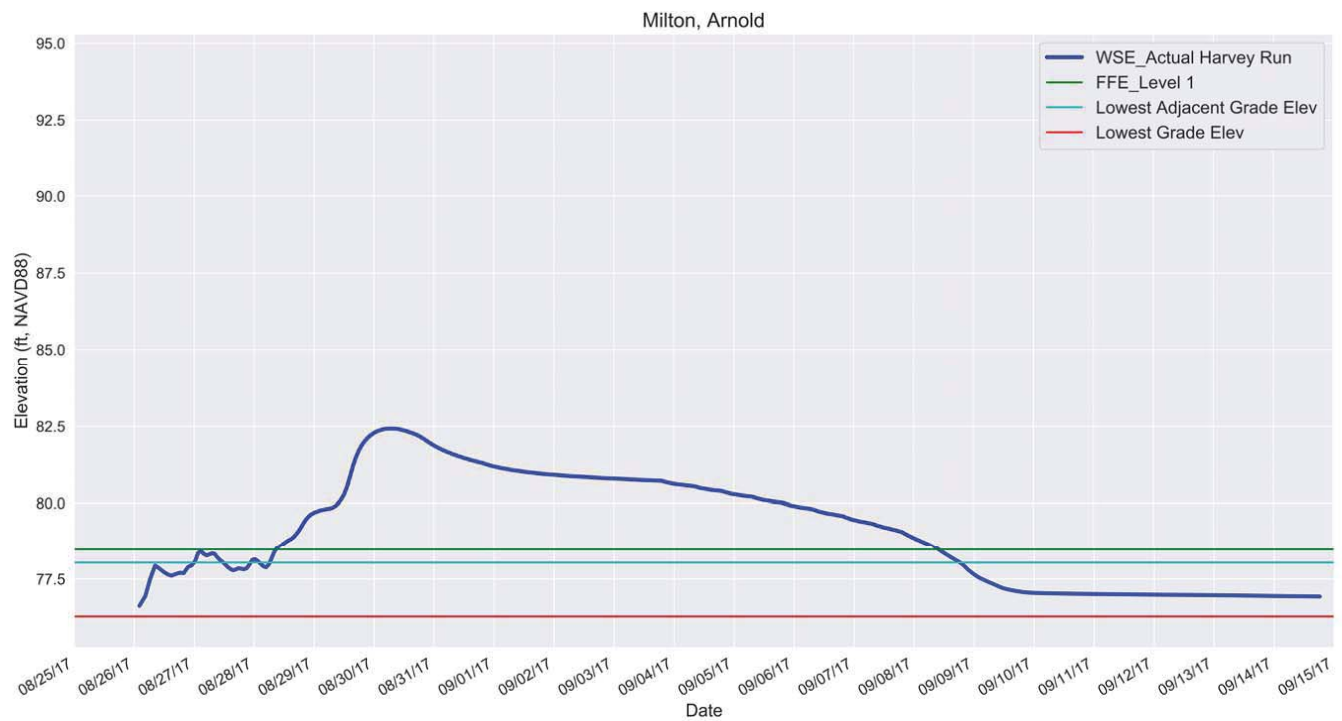


Figure C-4: Simulated water surface elevations at Milton, Arnold (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
82.4	82.0	4 ft	4 ft to 4 ft 4 in

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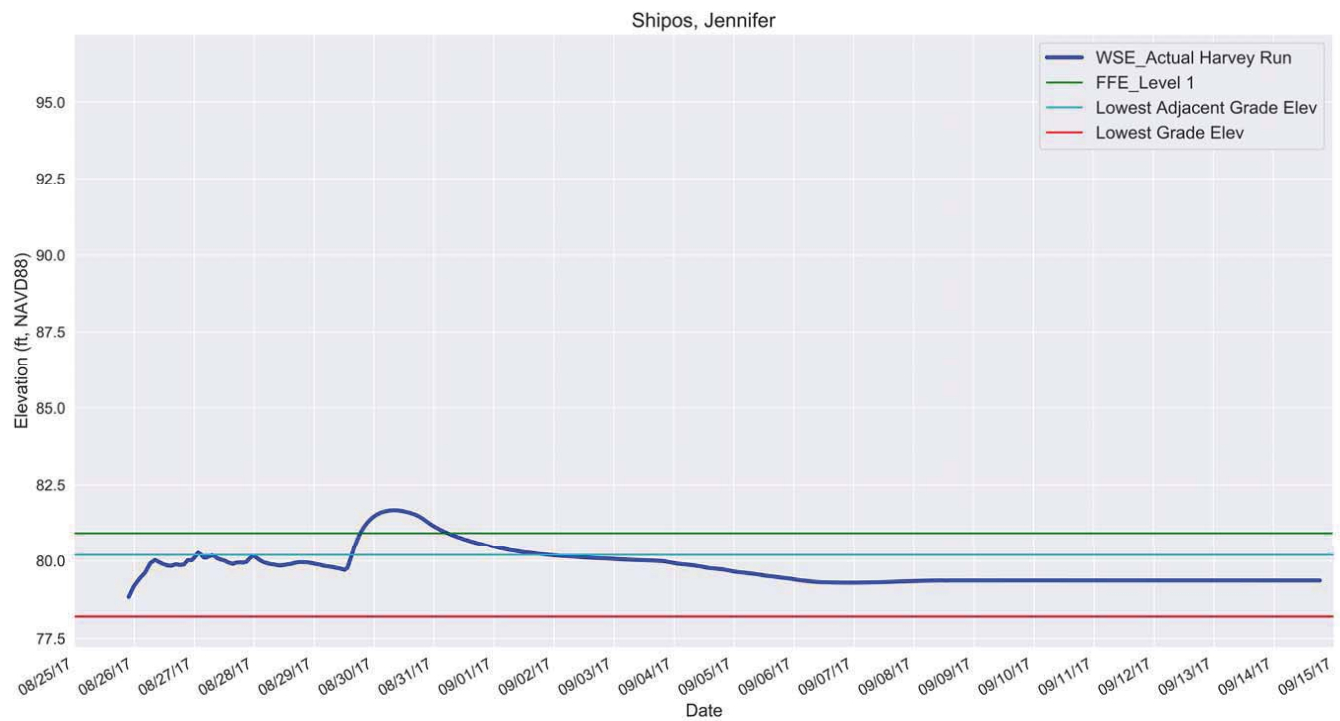


Figure C-5: Simulated water surface elevations at Shipos, Jennifer (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
81.7	N/A	9"	19" - 20" house, 24" backyard

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Figure C-6: Simulated water surface elevations at Hollis, Wayne (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
79.8	78.5	38.5"	43"- 45"

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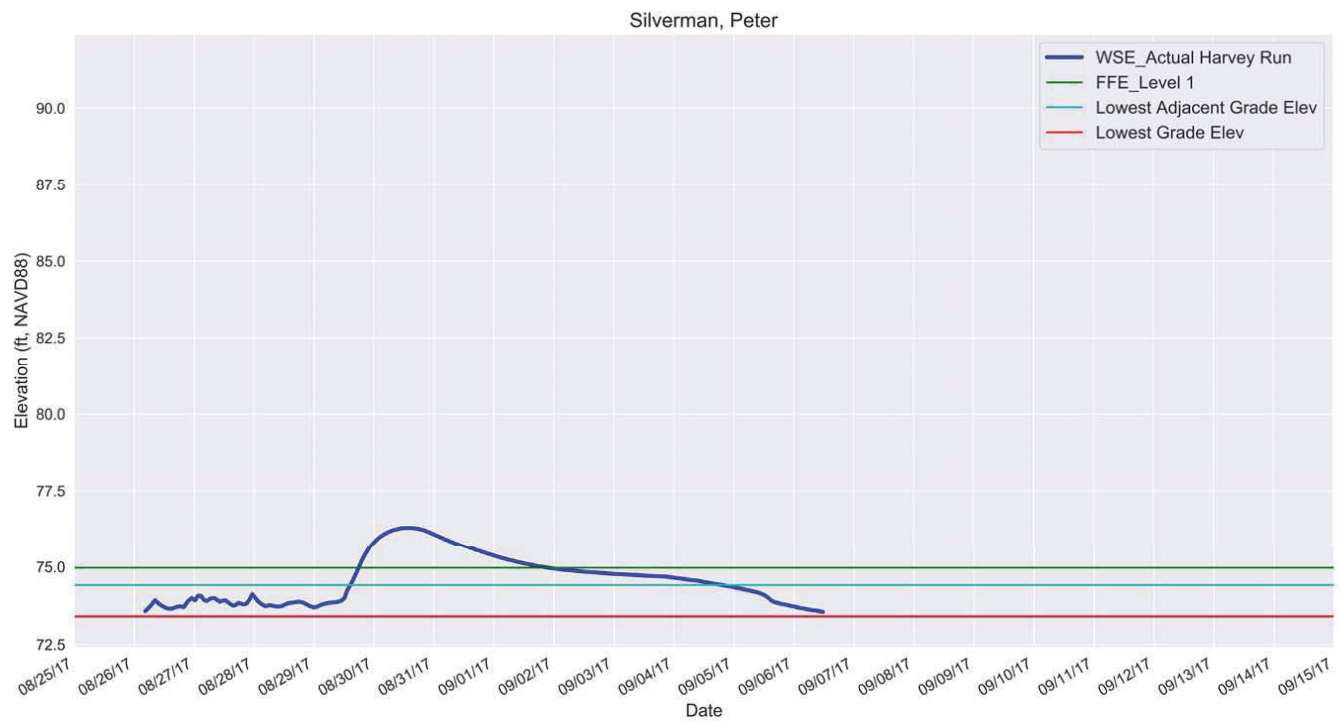


Figure C-7: Simulated water surface elevations at Silverman, Peter (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
76.3	76.1	16"	6" - 12" on 8/31

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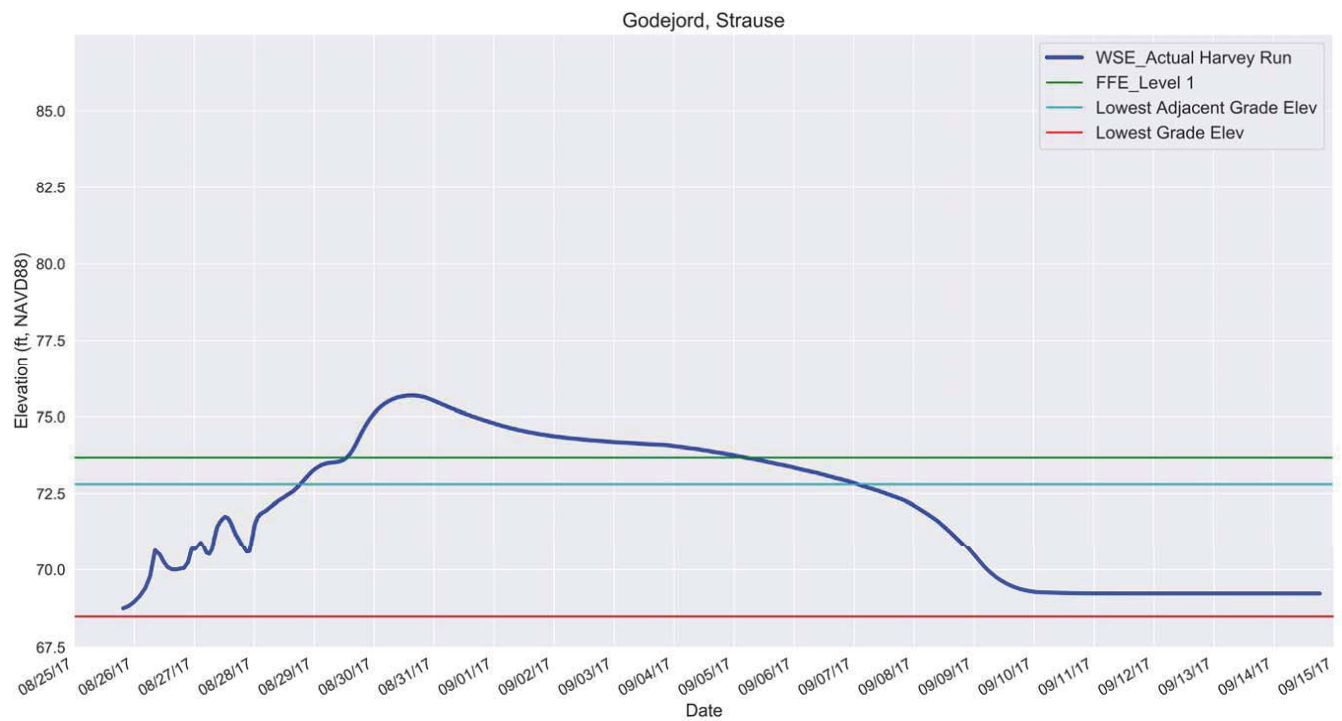


Figure C-8: Simulated water surface elevations at Godejord, Strause (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
75.7	N/A	2 ft	2 ft

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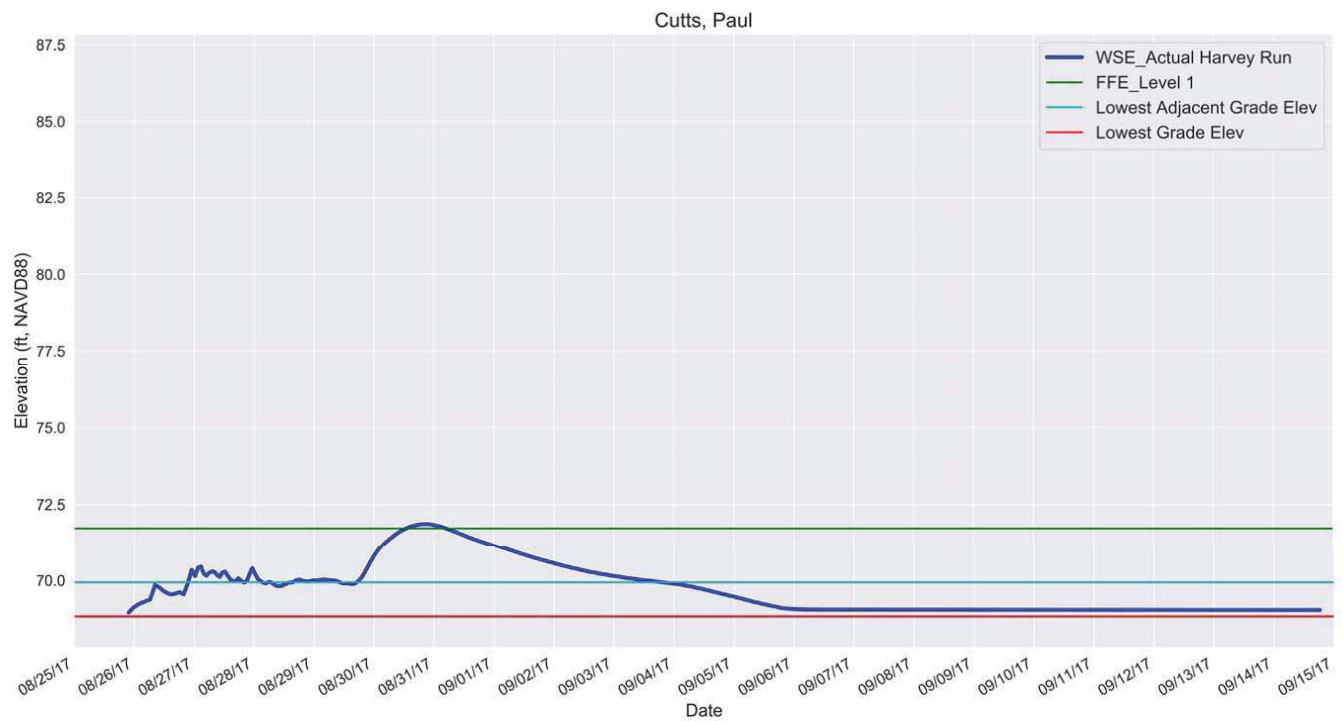


Figure C-9: Simulated water surface elevations at Cutts, Paul (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
71.9	72.7 / 72.8	1.6"	5 - 8" inside, 11-12" outside

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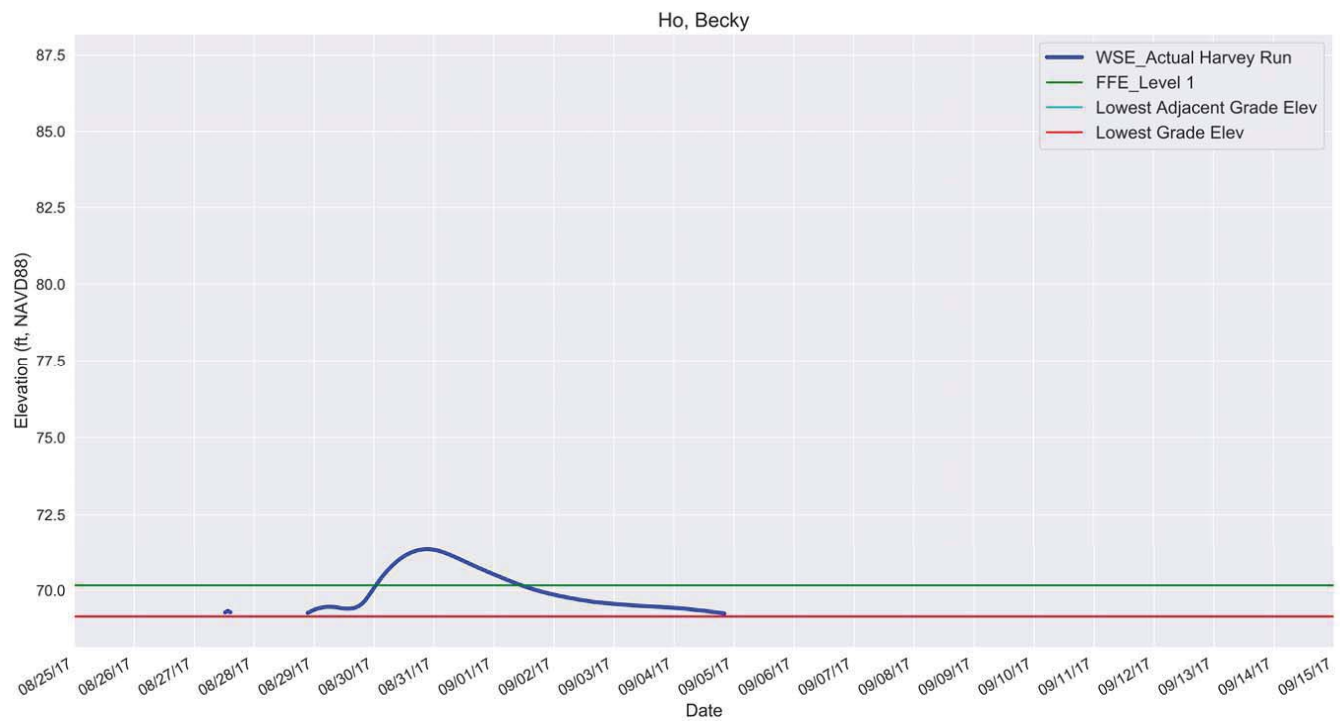
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**Figure C-10: Simulated water surface elevations at Ho, Becky (Actual Harvey Run)**

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
71.3	N/A	N/A	N/A

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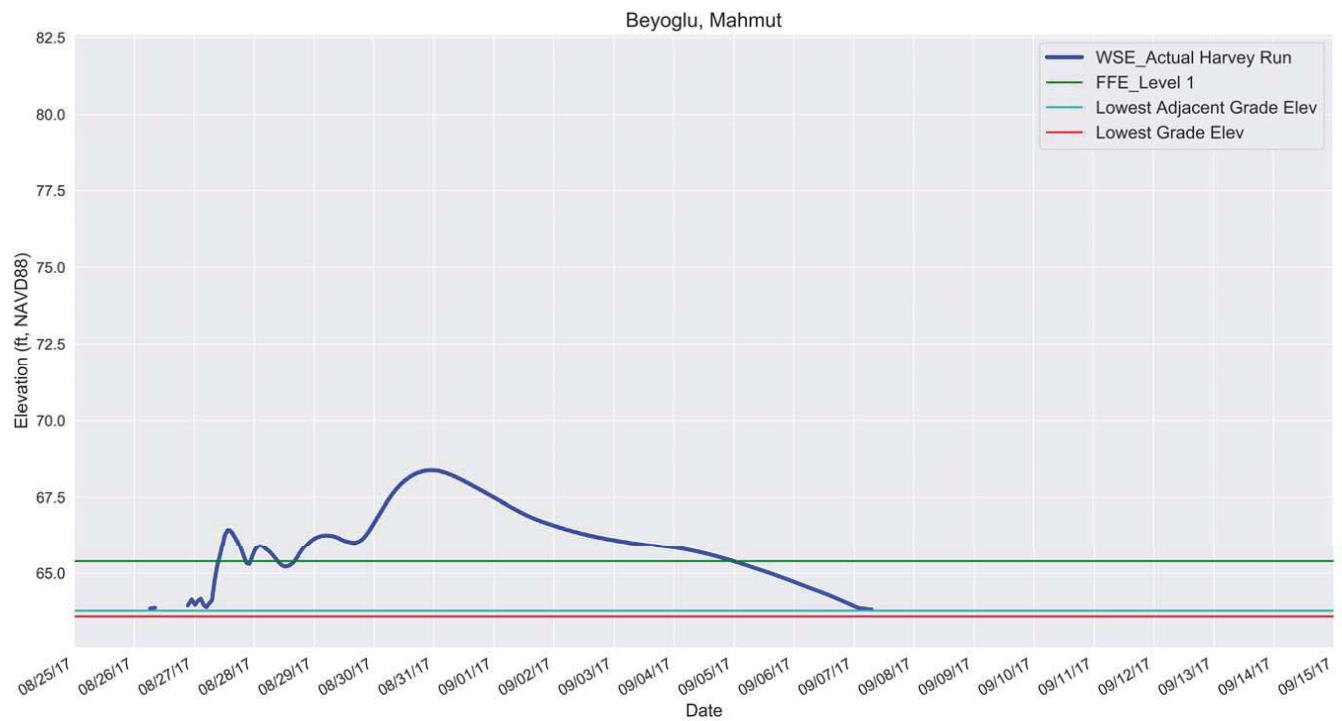


Figure C-11: Simulated water surface elevations at Beyoglu, Mahmut (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
68.4	67.1	3 ft	1.5 ft on Aug 27; peak up to 3.5 ft

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Figure C-12: Simulated water surface elevations at Azar, Philip (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
57.5	N/A	8.5	9.75 ft

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FFE at this Test Property is lower than the ground elevation. Because our model simulates surface water flows, simulated flood duration at this Test Property is only for two very brief periods of time when simulated WSE was above the ground elevation.

Figure C-13: Simulated water surface elevations at Stahl, Timothy (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
54.9	N/A	2.8	3.5 - 4 ft in lower level.

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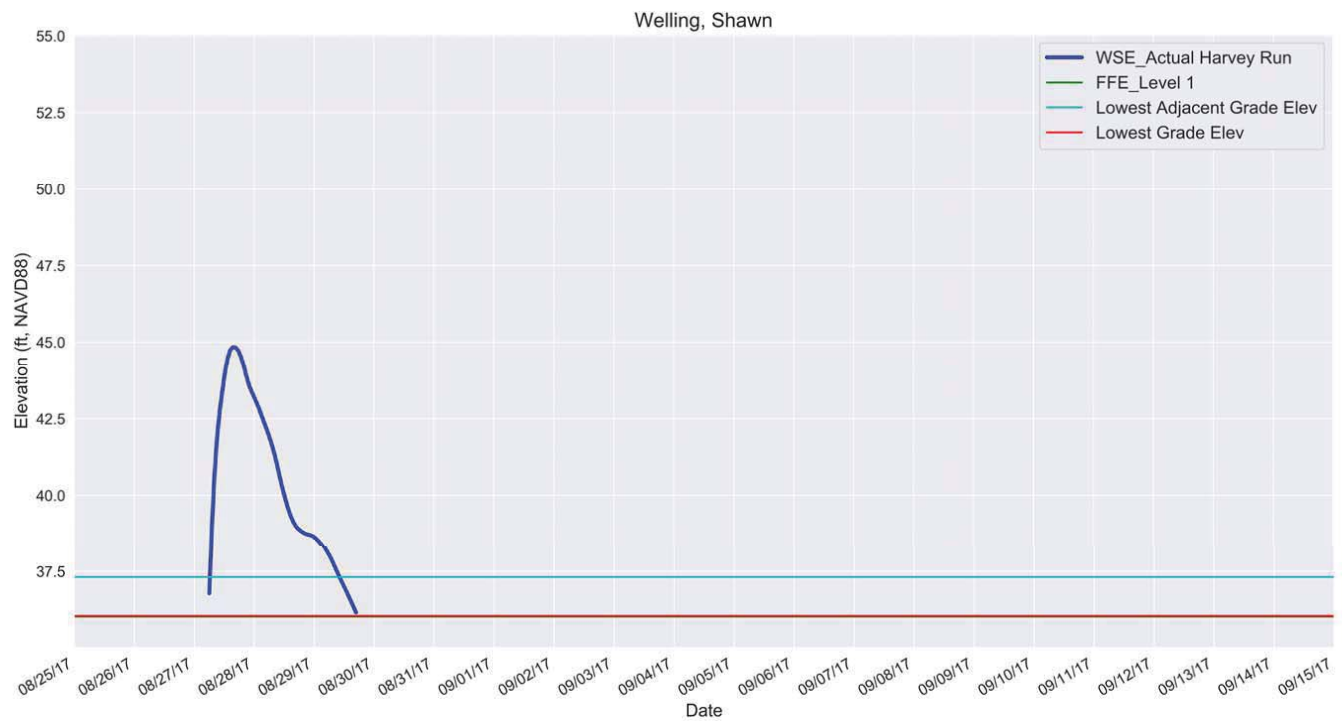


Figure C-14: Simulated water surface elevations at Welling, Shawn (Actual Harvey Run)

Simulated peak water surface elevation (ft, NAVD88)	Surveyed High Water Mark Elevation [20] (ft, NAVD88)	Simulated depth of water in First Floor	Alleged depth in first floor as per Plaintiff's deposition [50, p. BAIRD0000346]
44.8	N/A	8.8 ft	> 6 ft in basement

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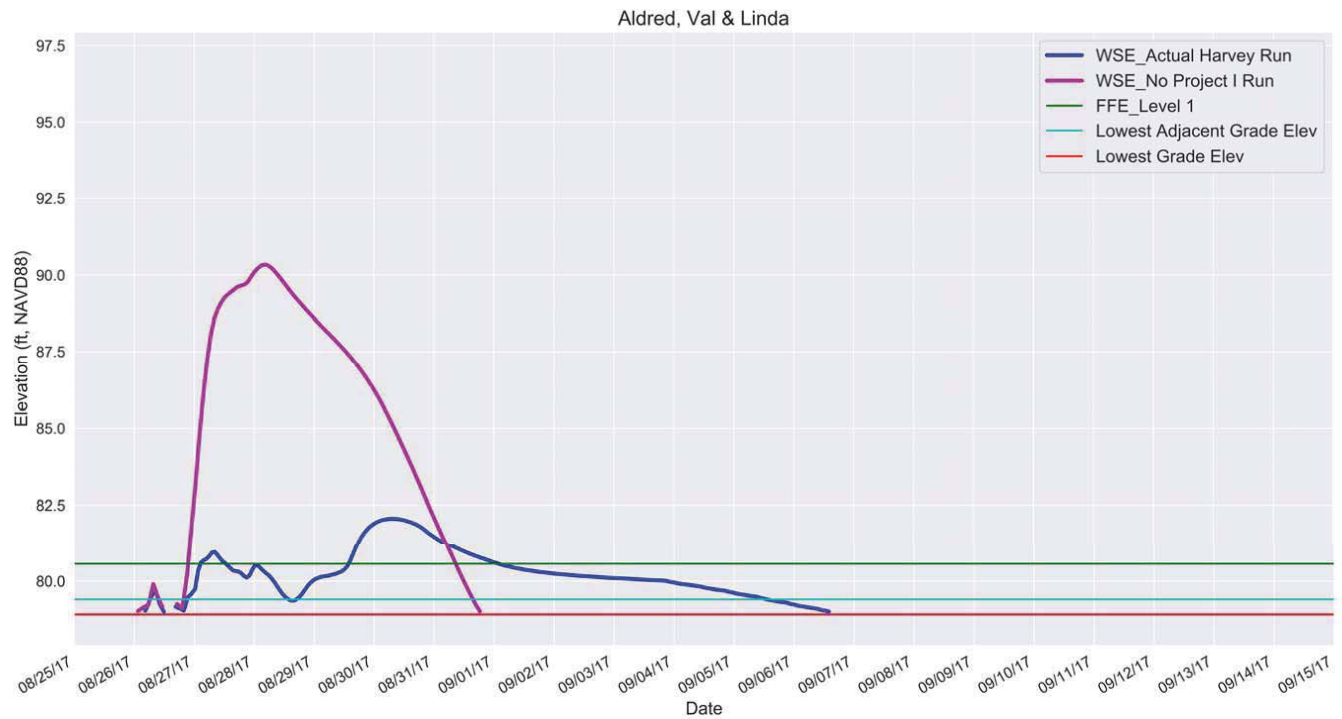


Figure C-15: Simulated free water surface elevations at Aldred, Val & Linda (Actual Harvey Run and No Project I Run)

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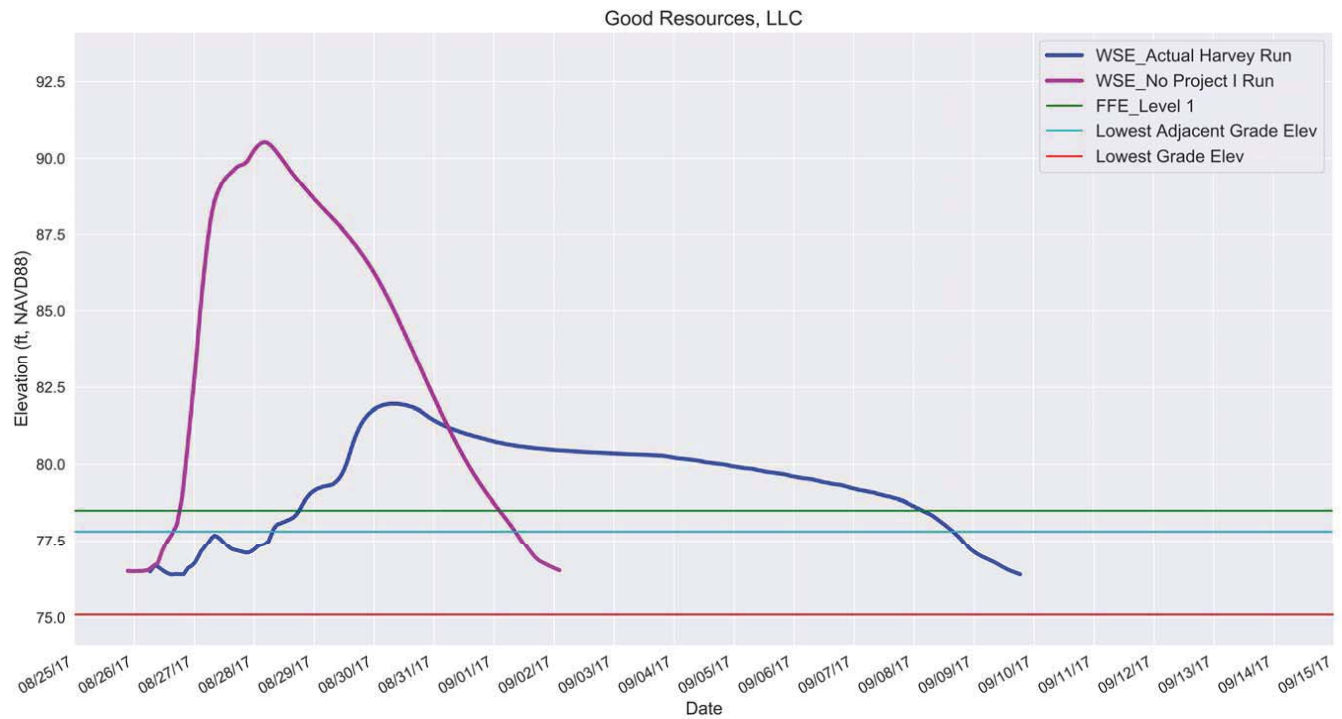


Figure C-16: Simulated free water surface elevations at Good Resources, LLC (Actual Harvey Run and No Project I Run)

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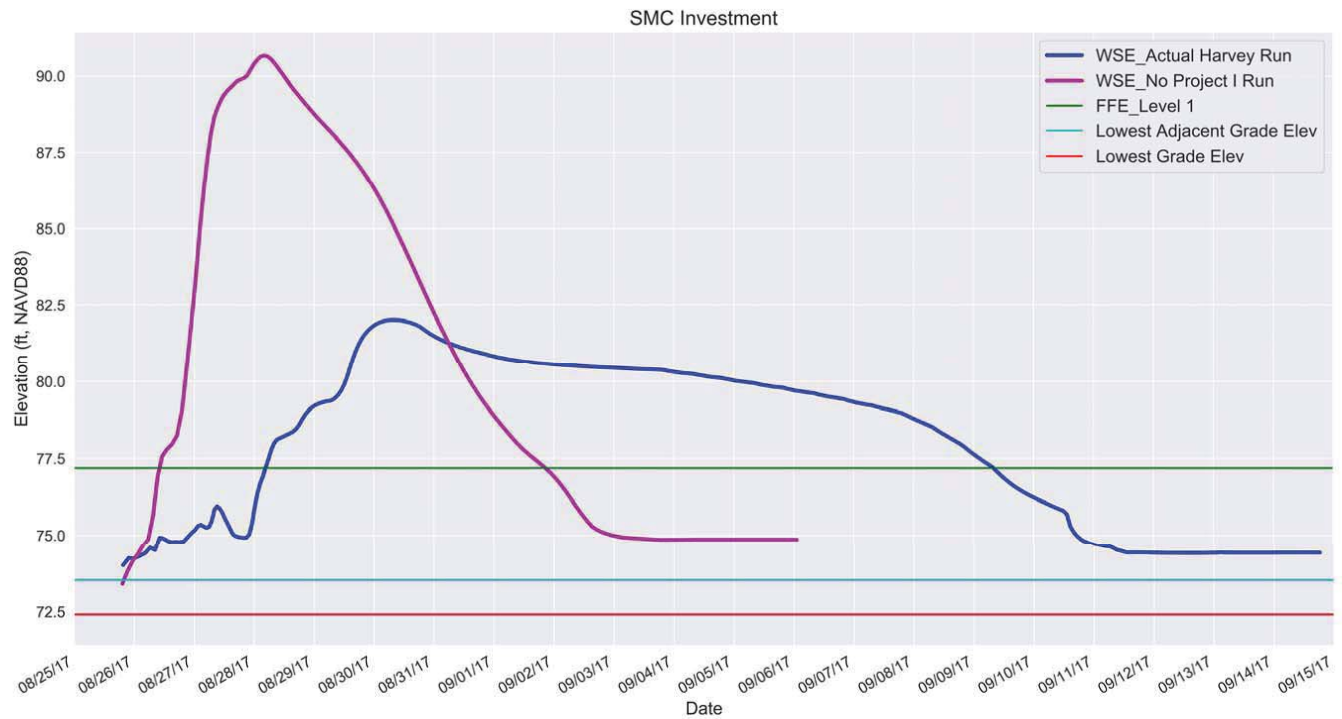


Figure C-17: Simulated free water surface elevations at SMC Investment (Actual Harvey Run and No Project I Run)

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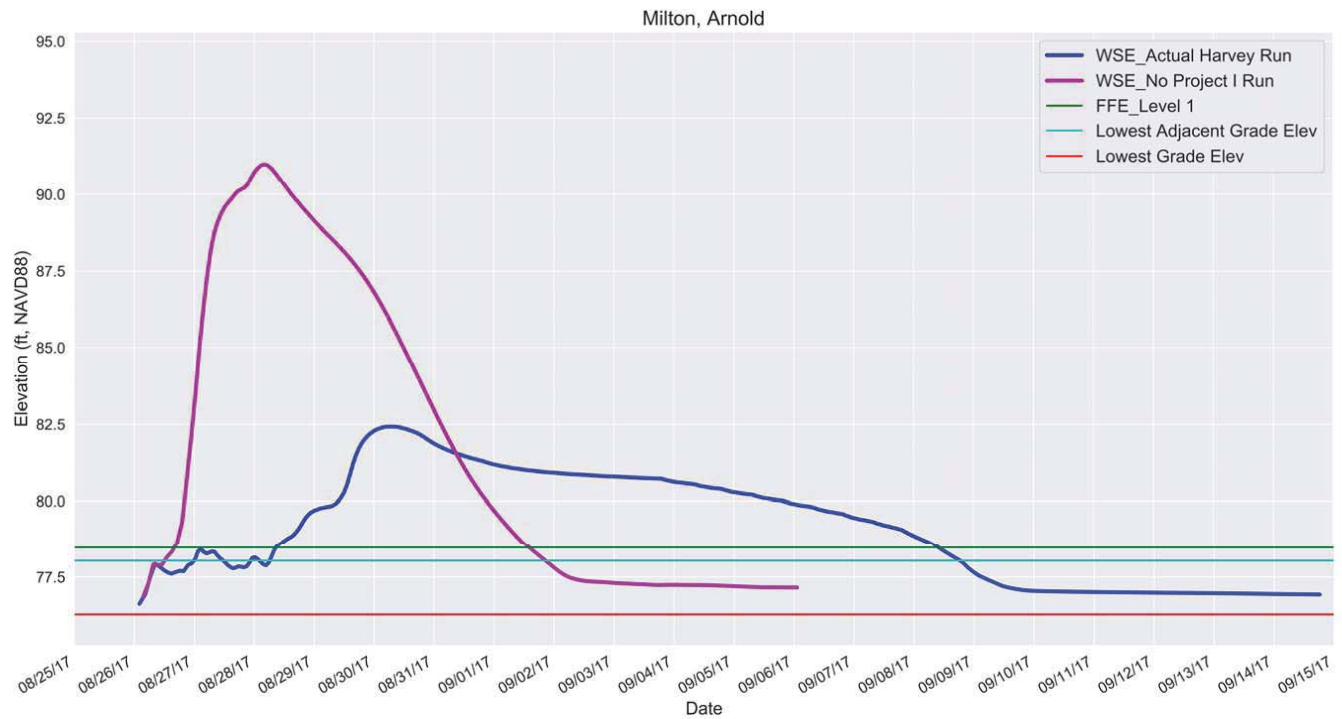


Figure C-18: Simulated free water surface elevations at Milton, Arnold (Actual Harvey Run and No Project I Run)

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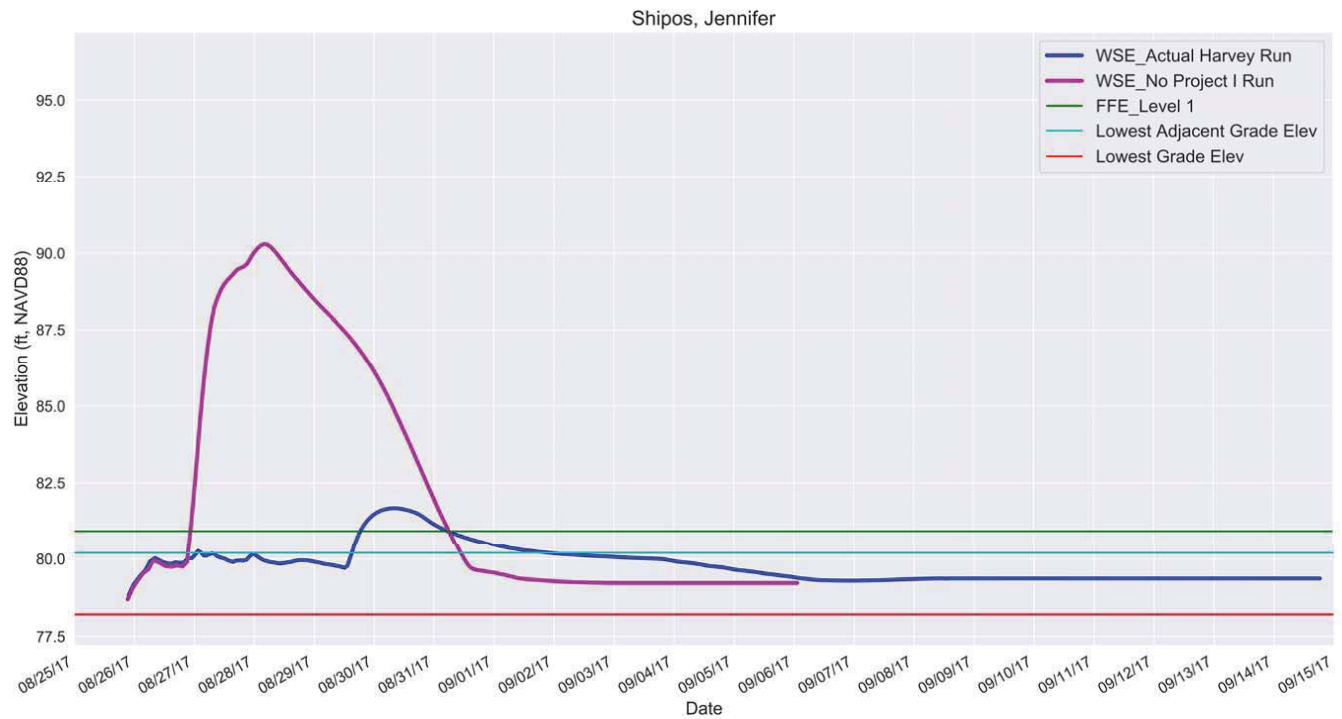


Figure C-19: Simulated free water surface elevations at Shipos, Jennifer (Actual Harvey Run and No Project I Run)

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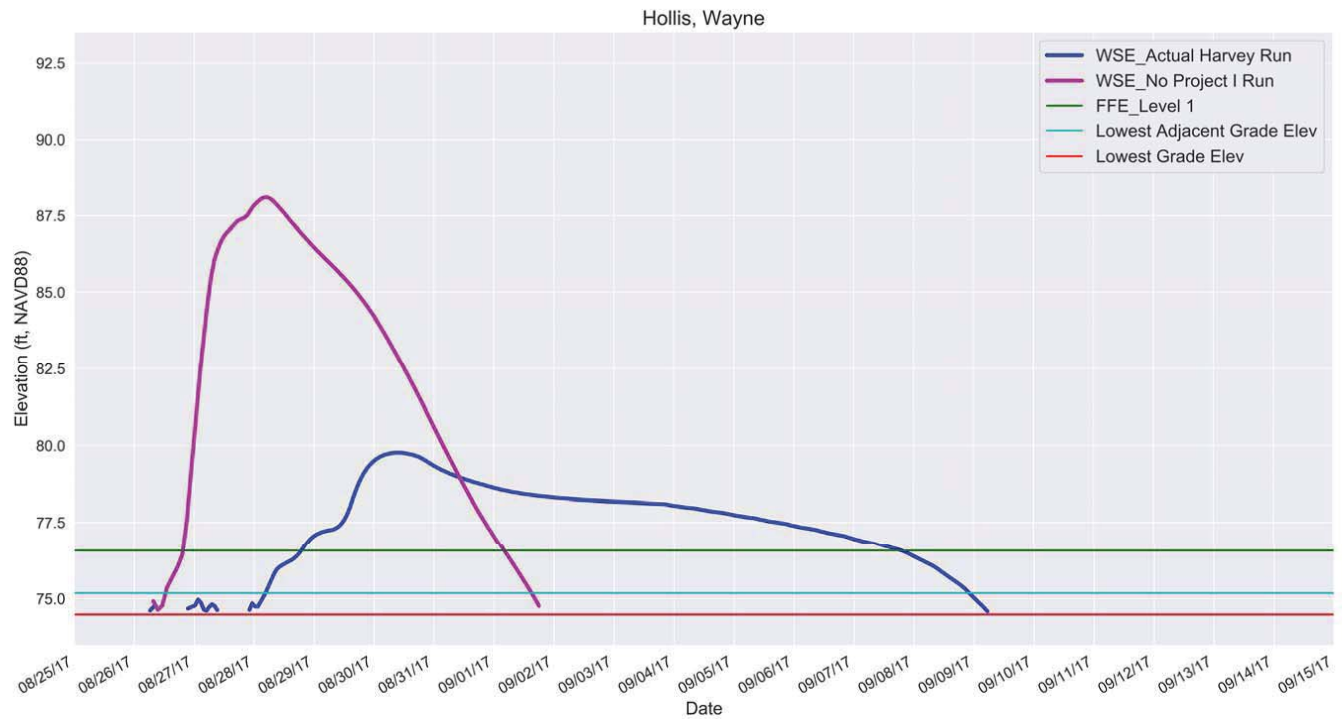


Figure C-20: Simulated free water surface elevations at Hollis, Wayne (Actual Harvey Run and No Project I Run)

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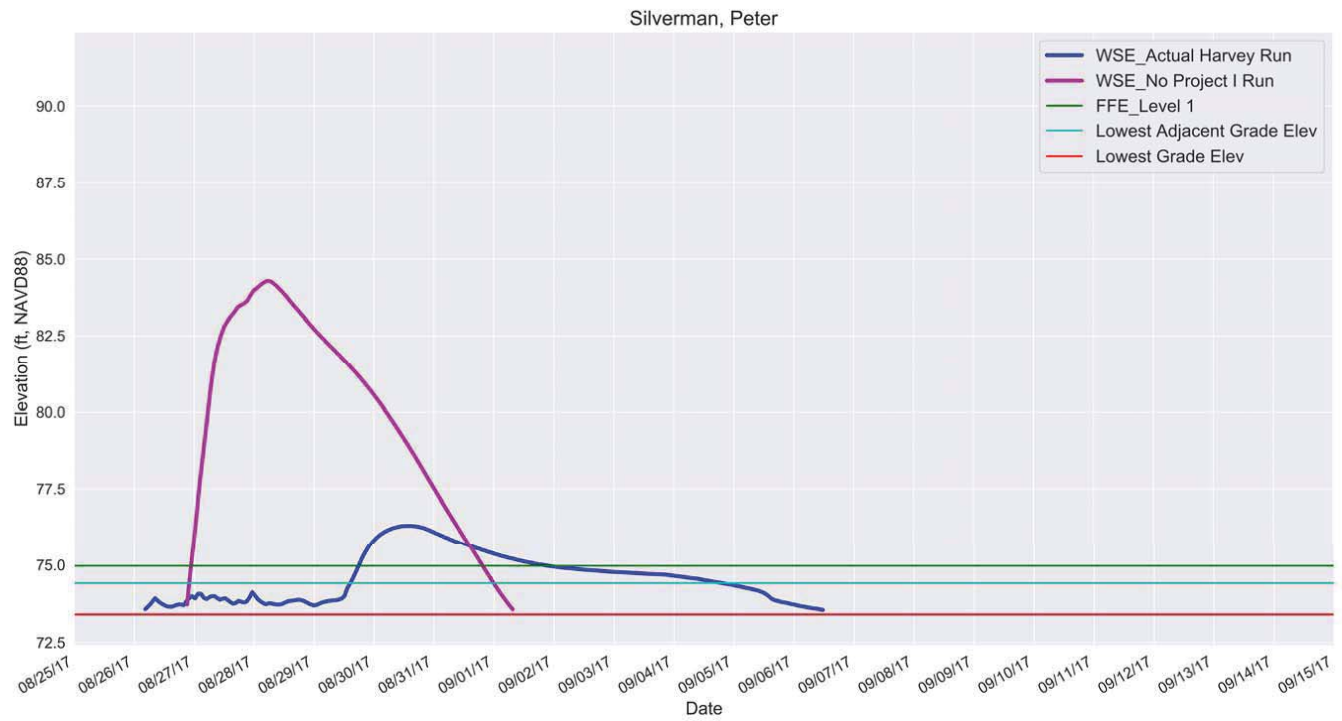


Figure C-21: Simulated free water surface elevations at Silverman, Peter (Actual Harvey Run and No Project I Run)

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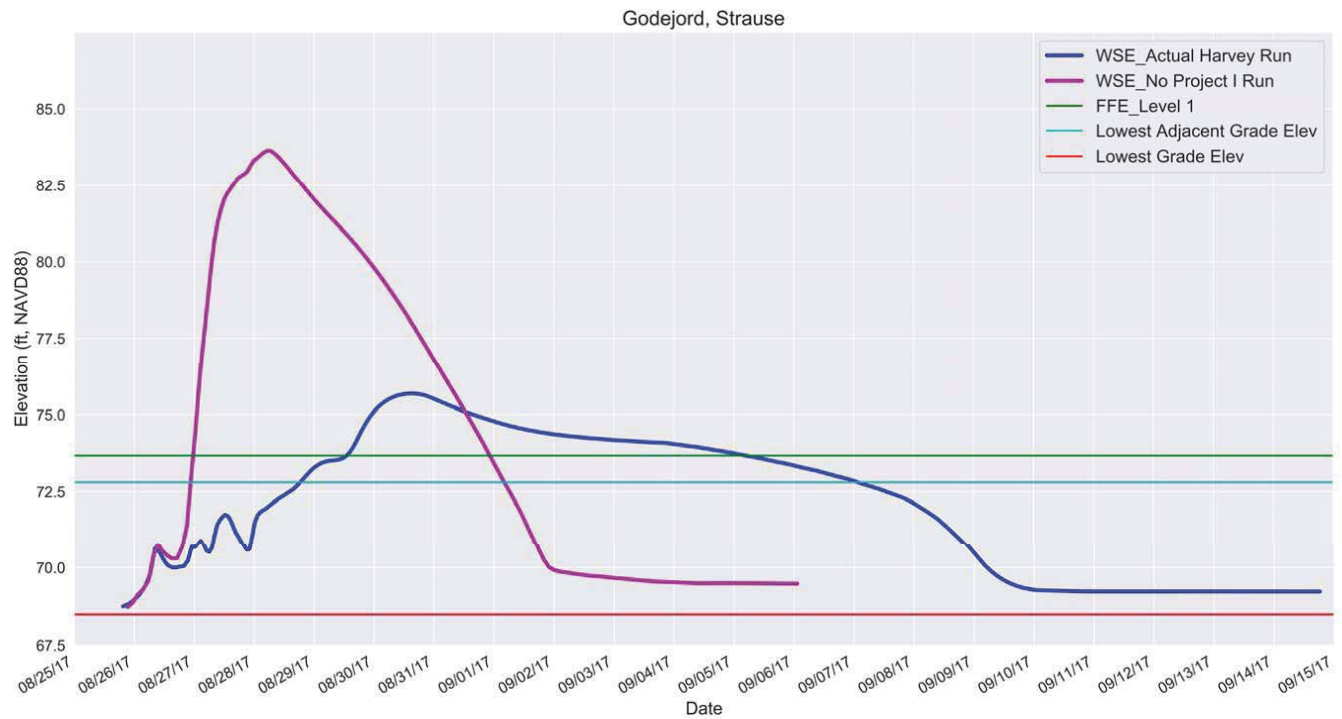


Figure C-22: Simulated free water surface elevations at Godejord, Strause (Actual Harvey Run and No Project I Run)

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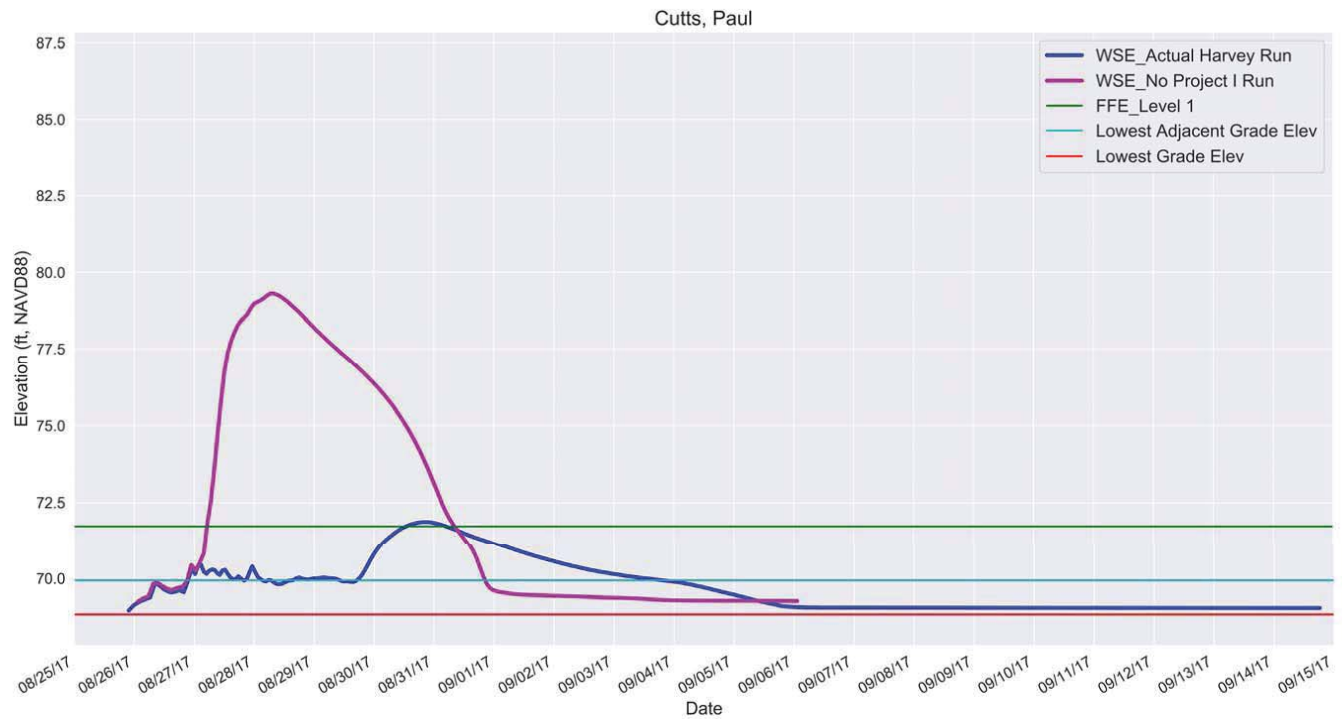


Figure C-23: Simulated free water surface elevations at Cutts, Paul (Actual Harvey Run and No Project I Run)

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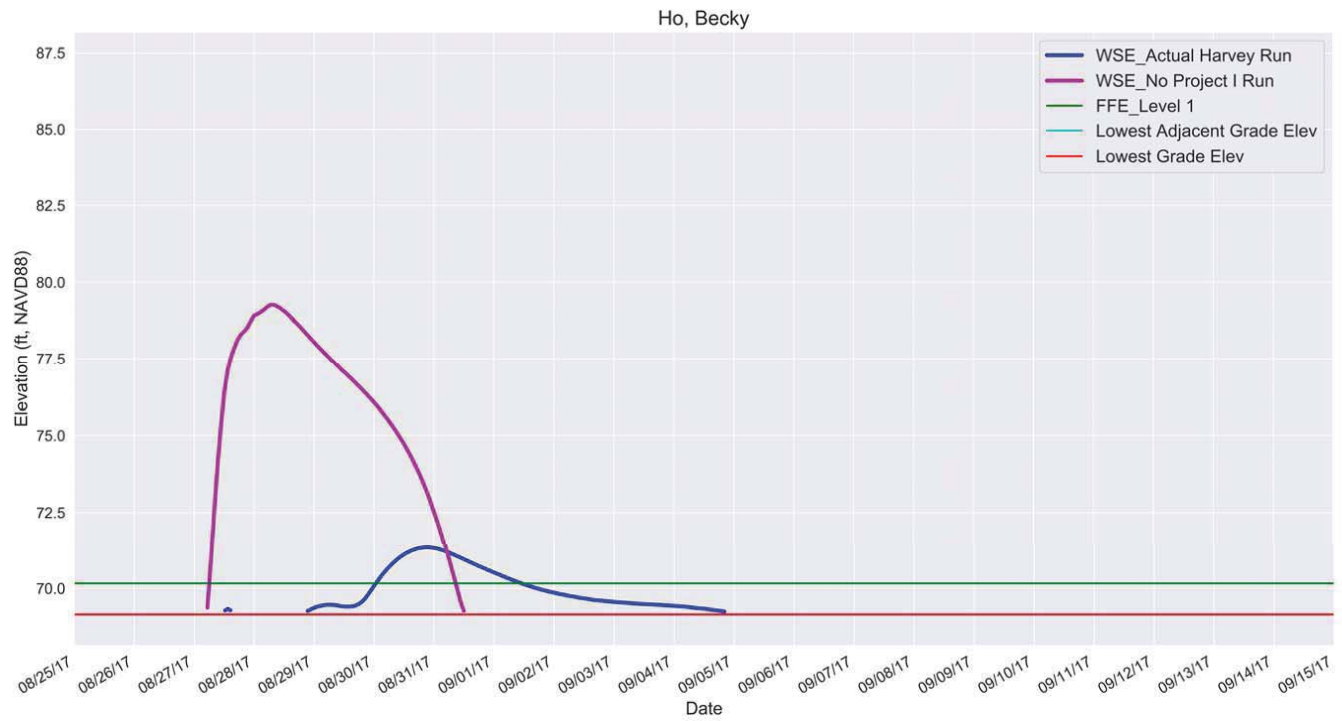


Figure C-24: Simulated free water surface elevations at Ho, Becky (Actual Harvey Run and No Project I Run)

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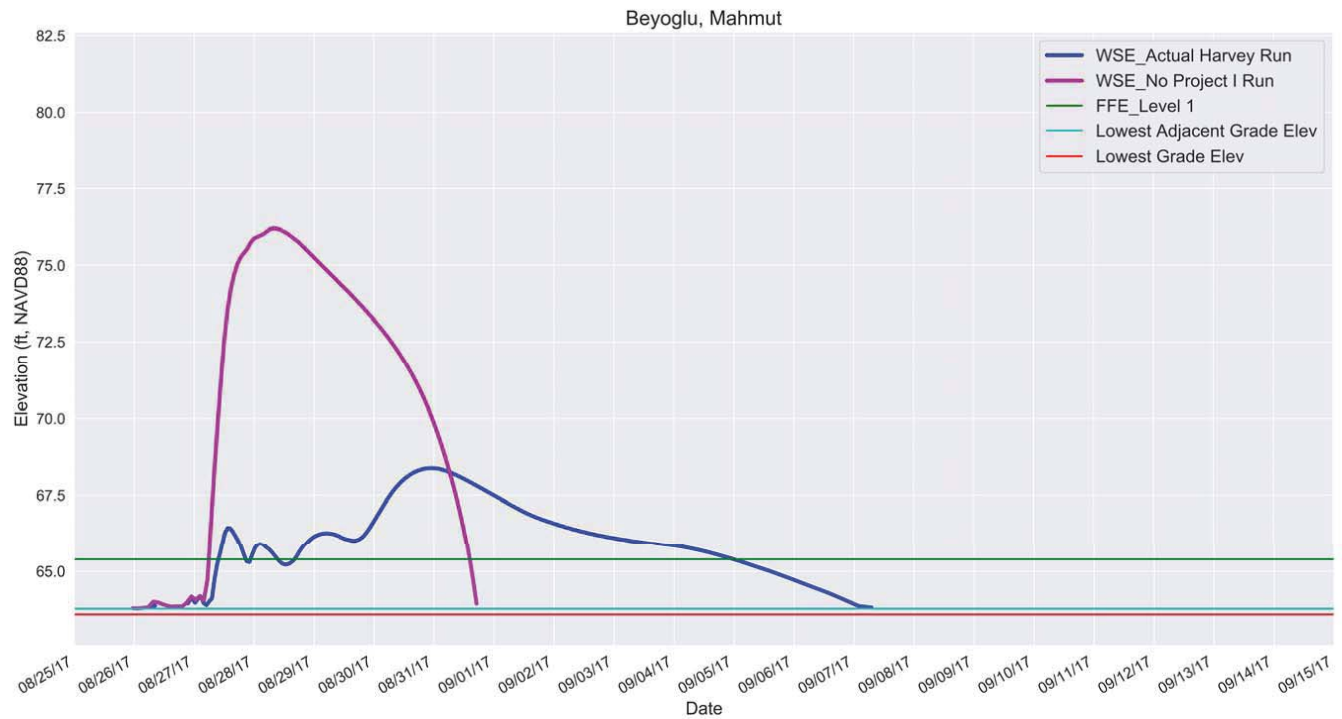


Figure C-25: Simulated free water surface elevations at Beyoglu, Mahmut (Actual Harvey Run and No Project I Run)

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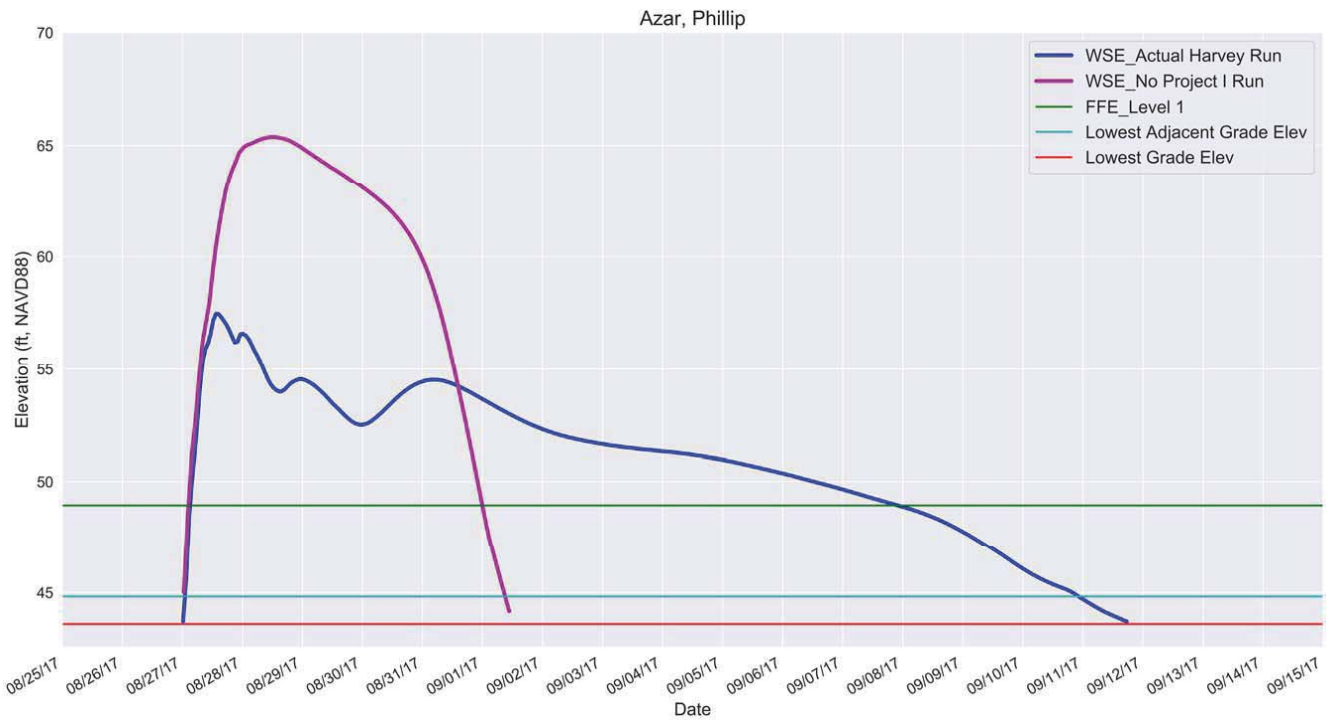


Figure C-26: Simulated free water surface elevations at Azar, Phillip (Actual Harvey Run and No Project I Run)

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Figure C-27: Simulated free water surface elevations at Stahl, Timothy (Actual Harvey Run and No Project I Run)

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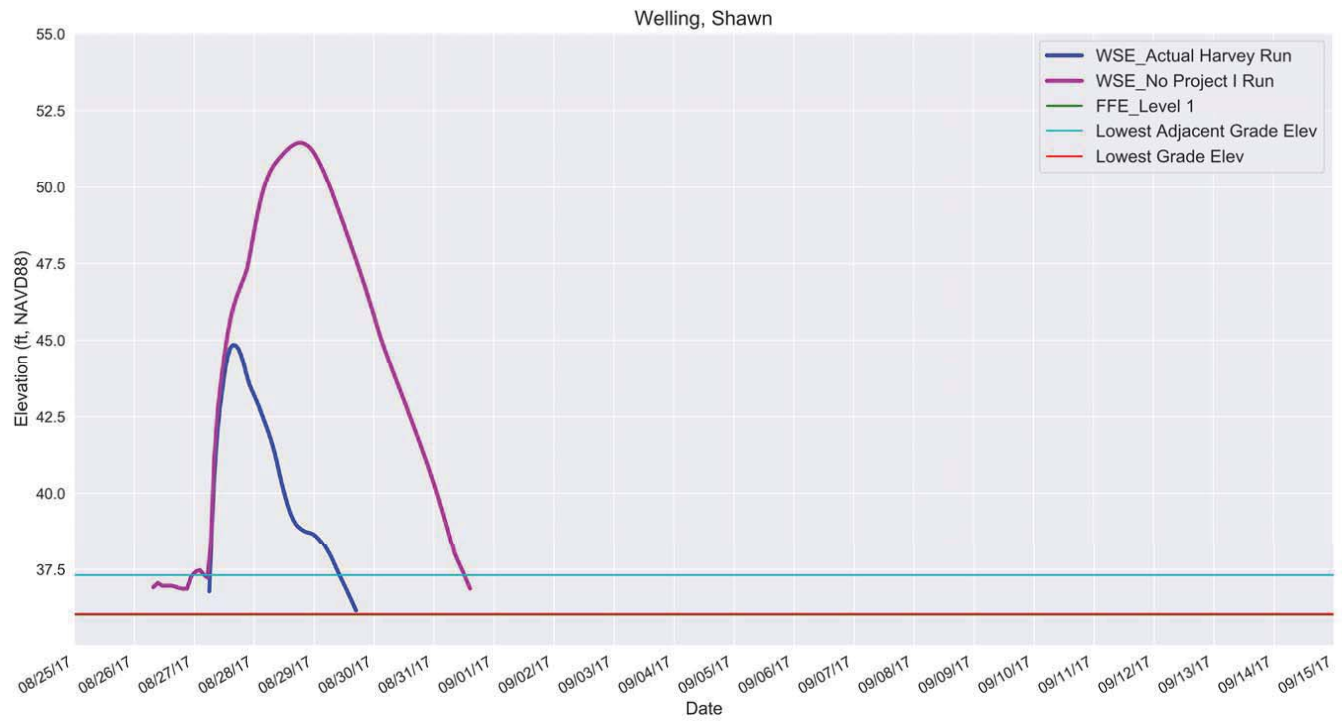


Figure C-28: Simulated free water surface elevations at Welling, Shawn (Actual Harvey Run and No Project I Run)

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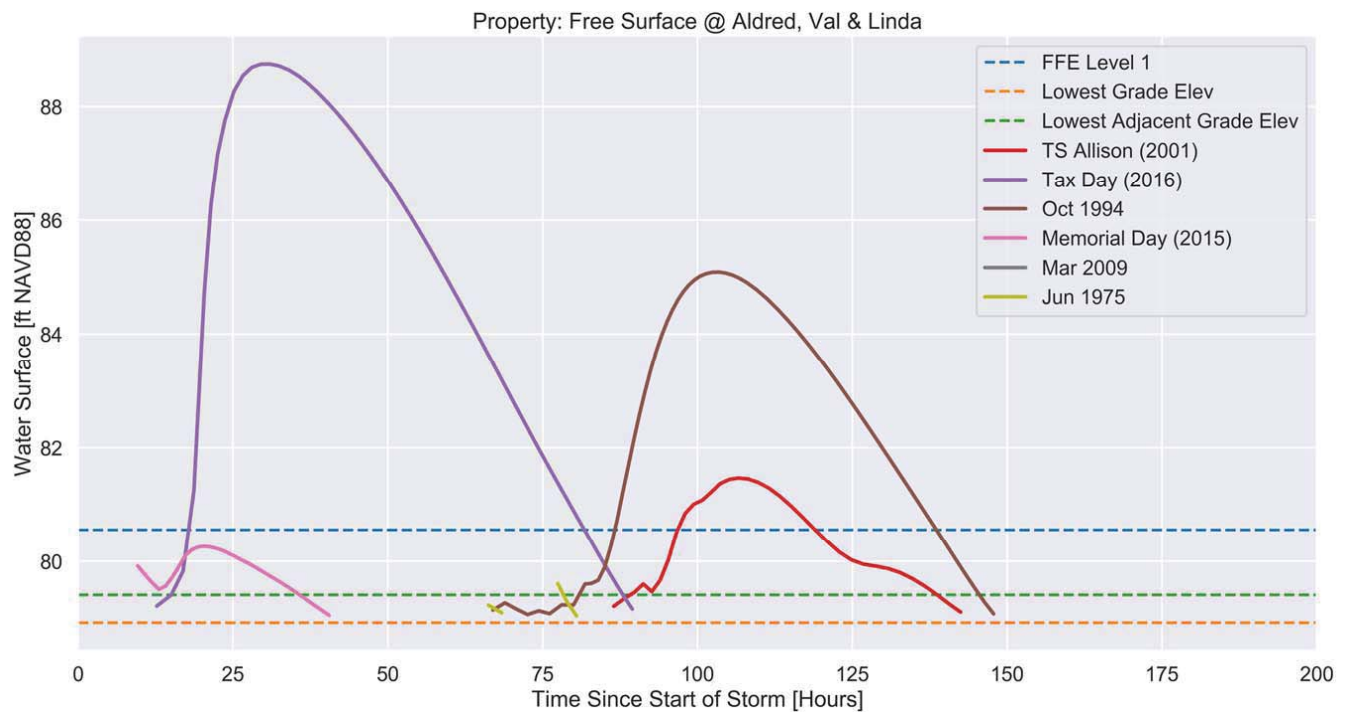


Figure C-29: Simulated free water surface elevations at Aldred, Val & Linda (Historical Storms)

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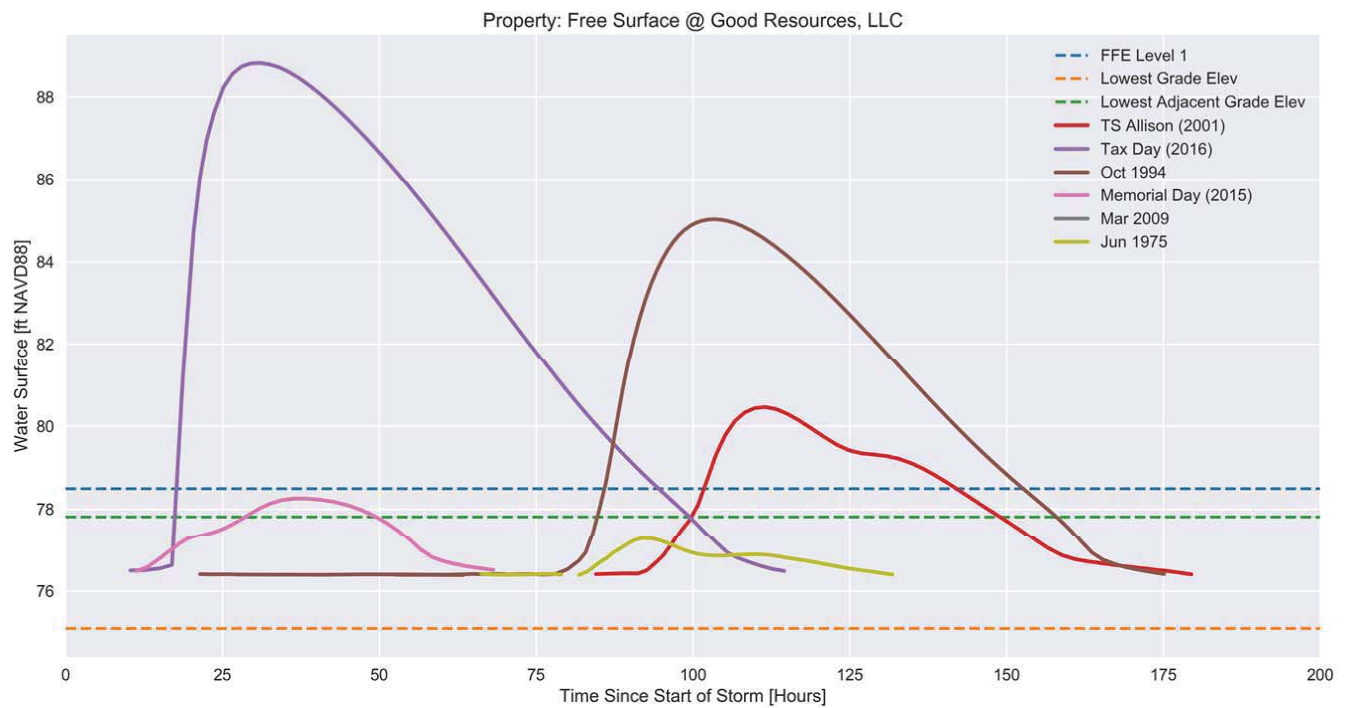


Figure C-30: Simulated free water surface elevations at Good Resources, LLC (Historical Storms)

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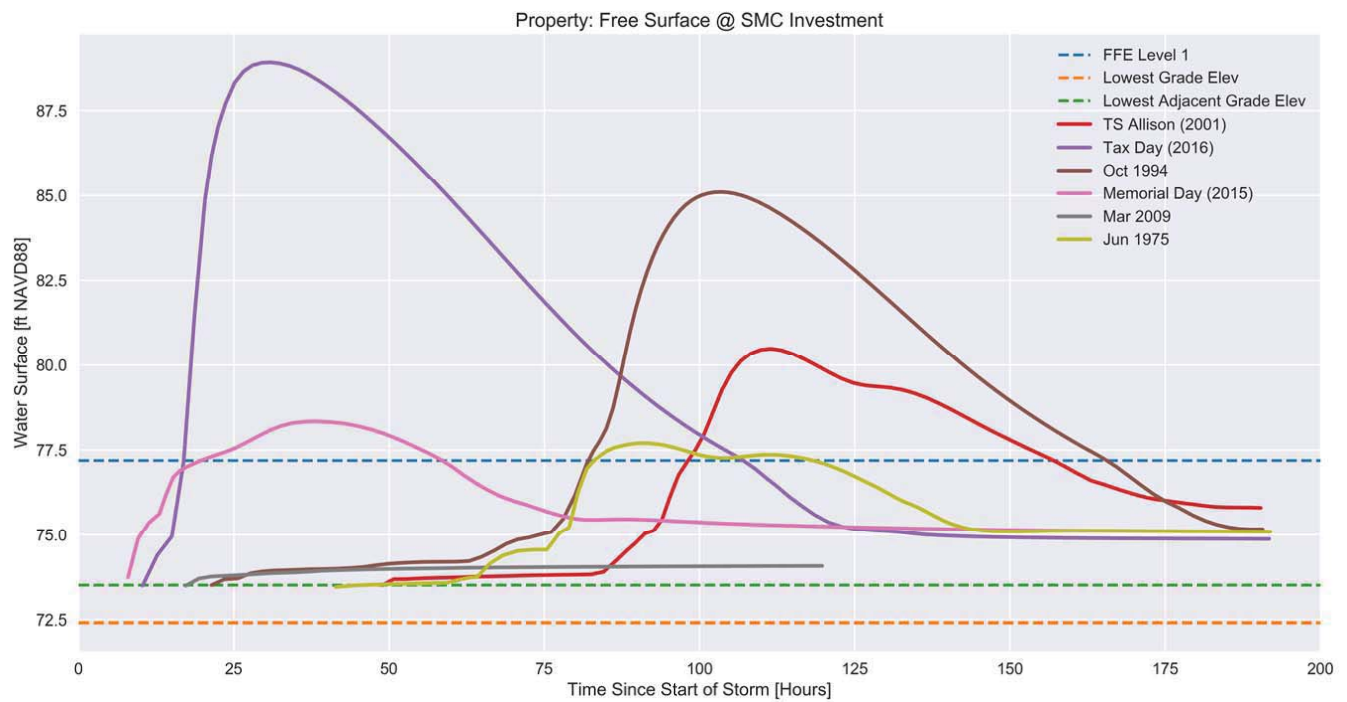


Figure C-31: Simulated free water surface elevations at SMC Investment (Historical Storms)

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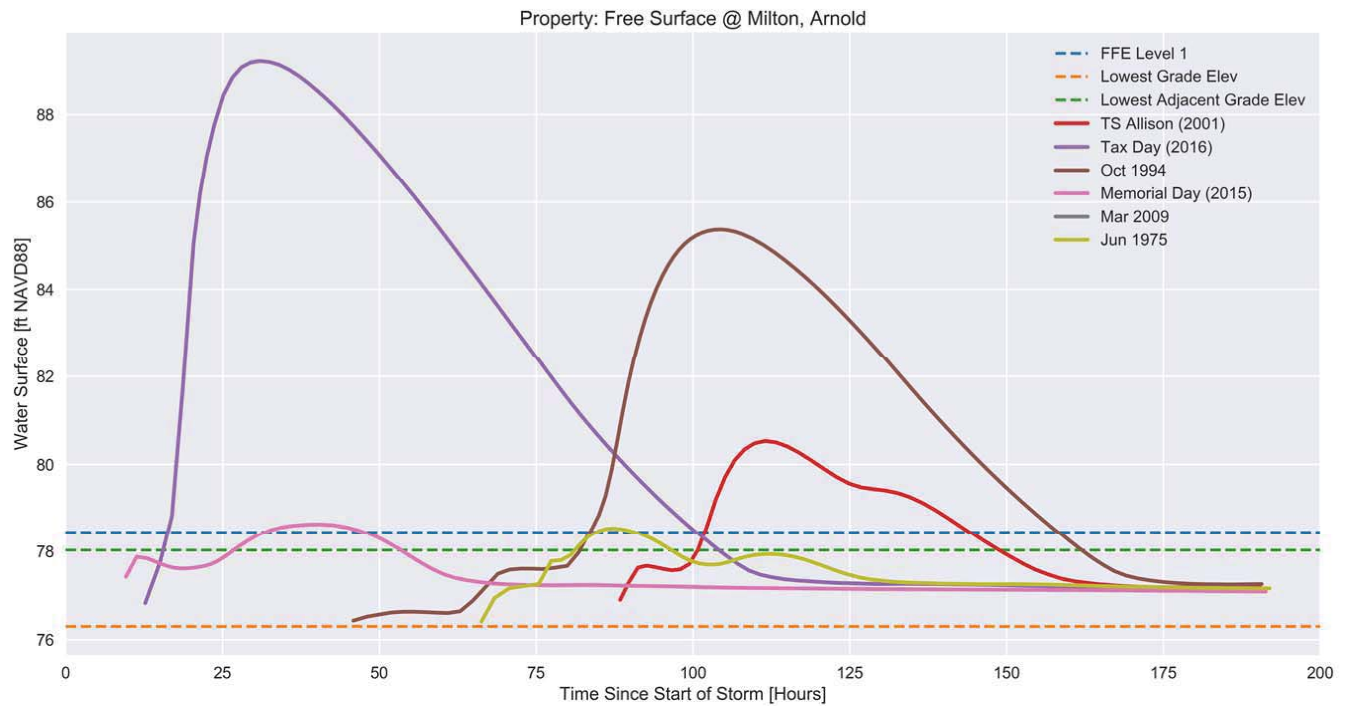


Figure C-32: Simulated free water surface elevations at Milton, Arnold (Historical Storms)

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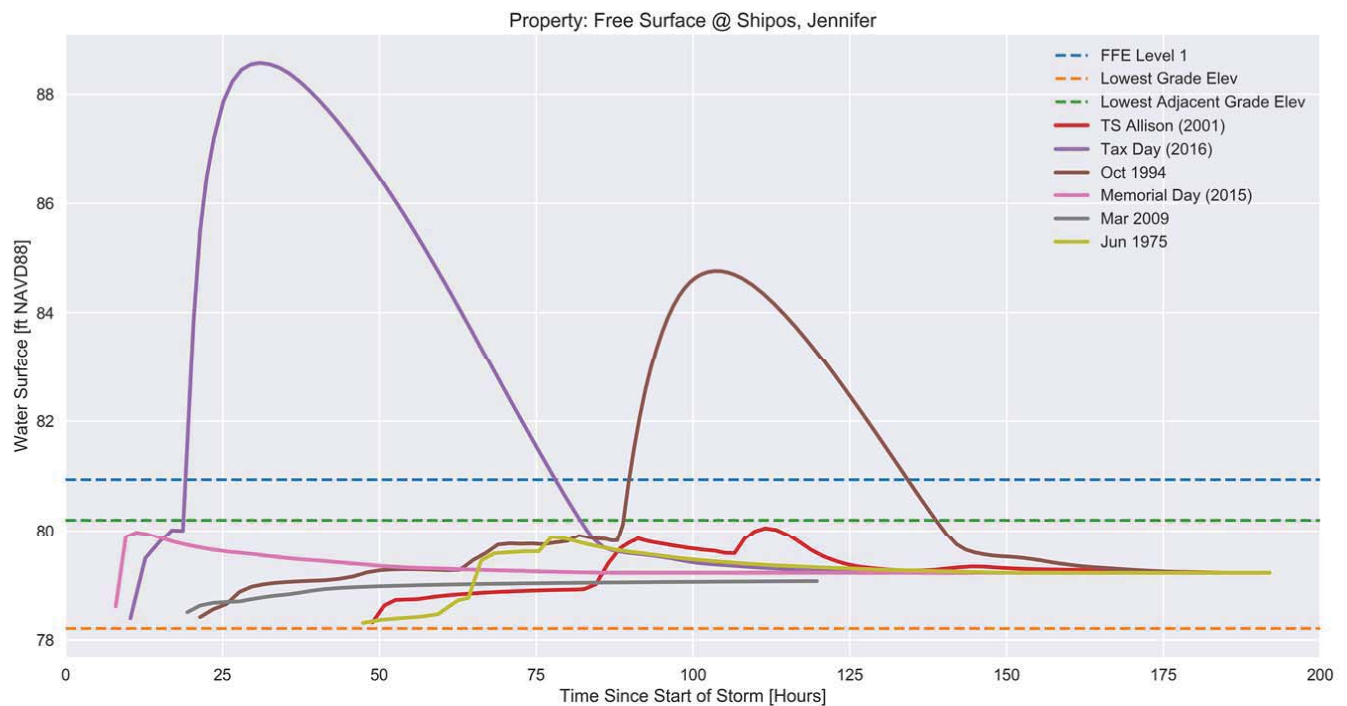


Figure C-33: Simulated free water surface elevations at Shipos, Jennifer (Historical Storms)

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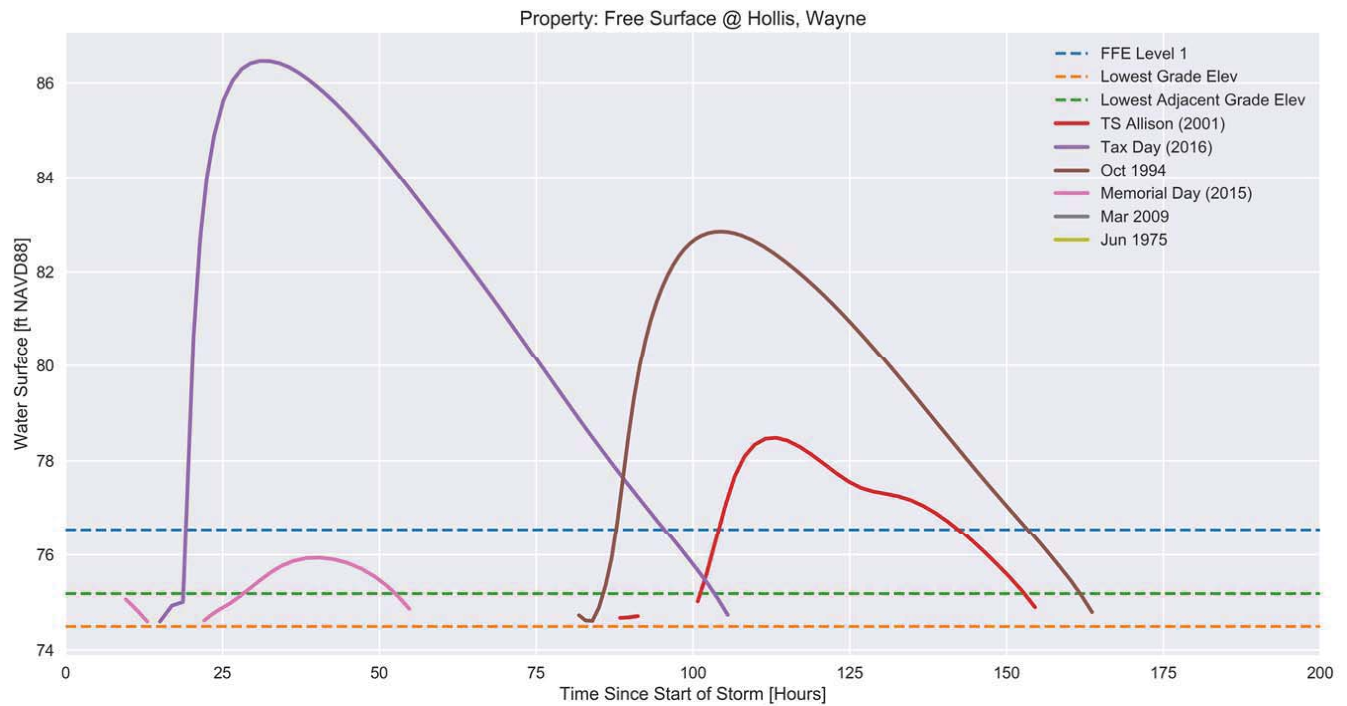


Figure C-34: Simulated free water surface elevations at Hollis, Wayne (Historical Storms)

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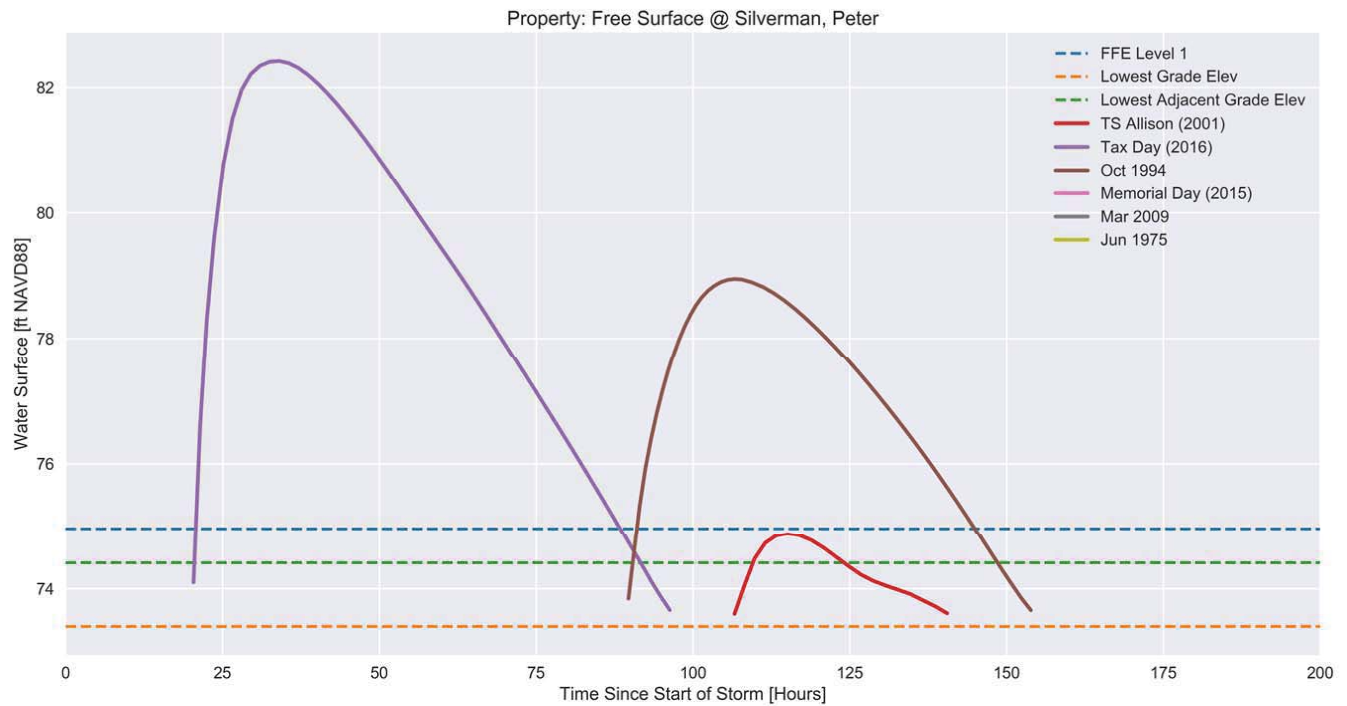


Figure C-35: Simulated free water surface elevations at Silverman, Peter (Historical Storms)

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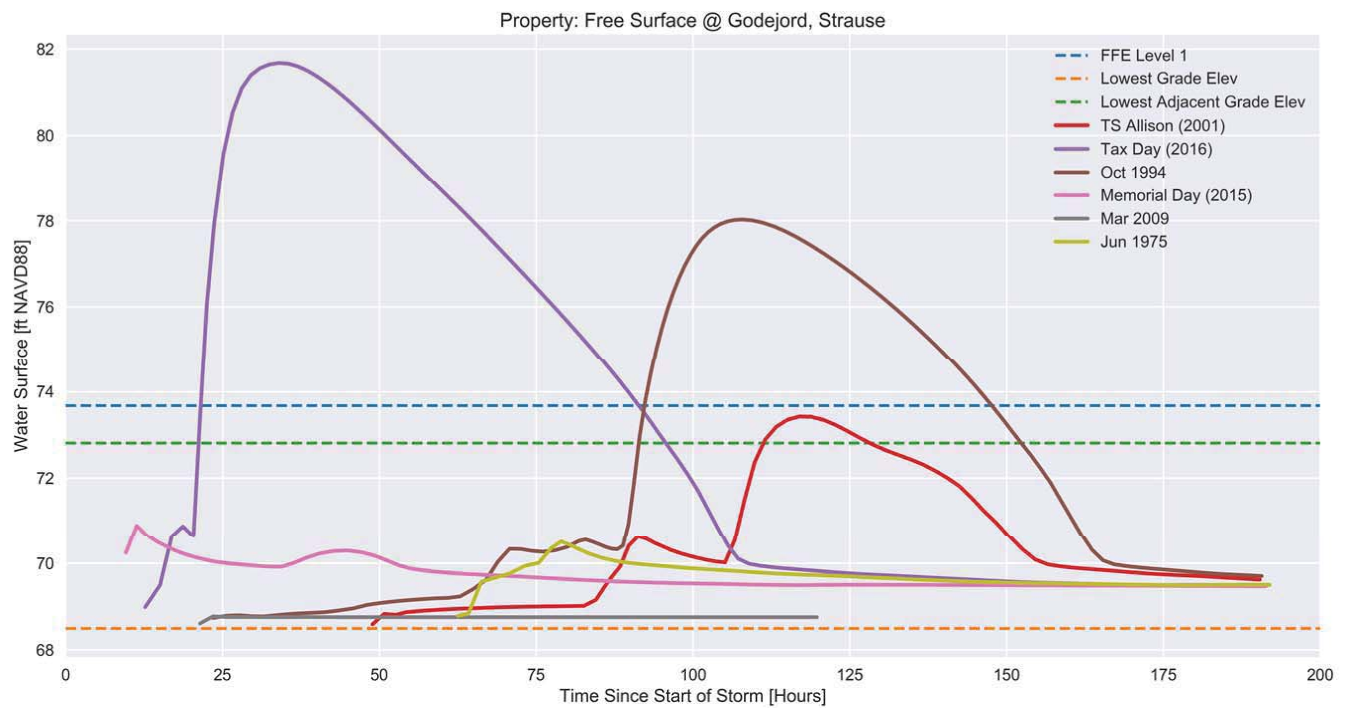


Figure C-36: Simulated free water surface elevations at Godejord, Strause (Historical Storms)

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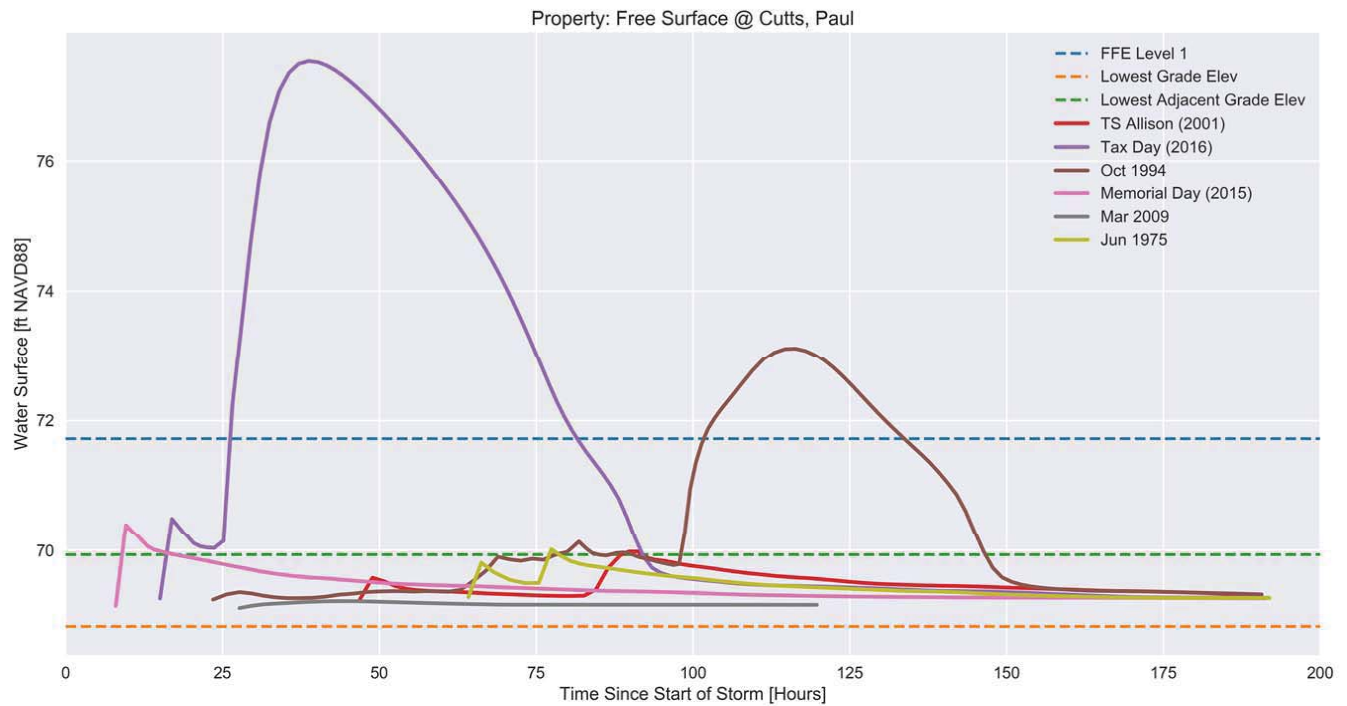


Figure C-37: Simulated free water surface elevations at Cutts, Paul (Historical Storms)

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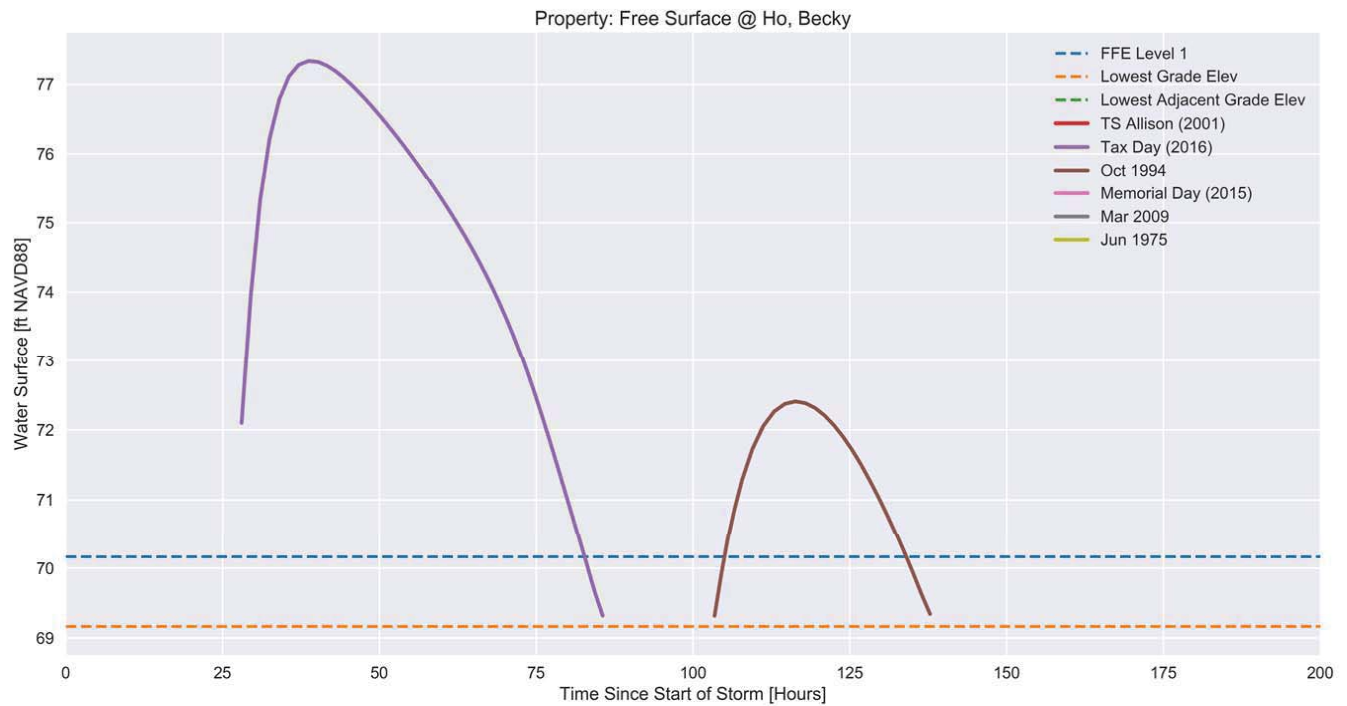


Figure C-38: Simulated free water surface elevations at Ho, Becky (Historical Storms)

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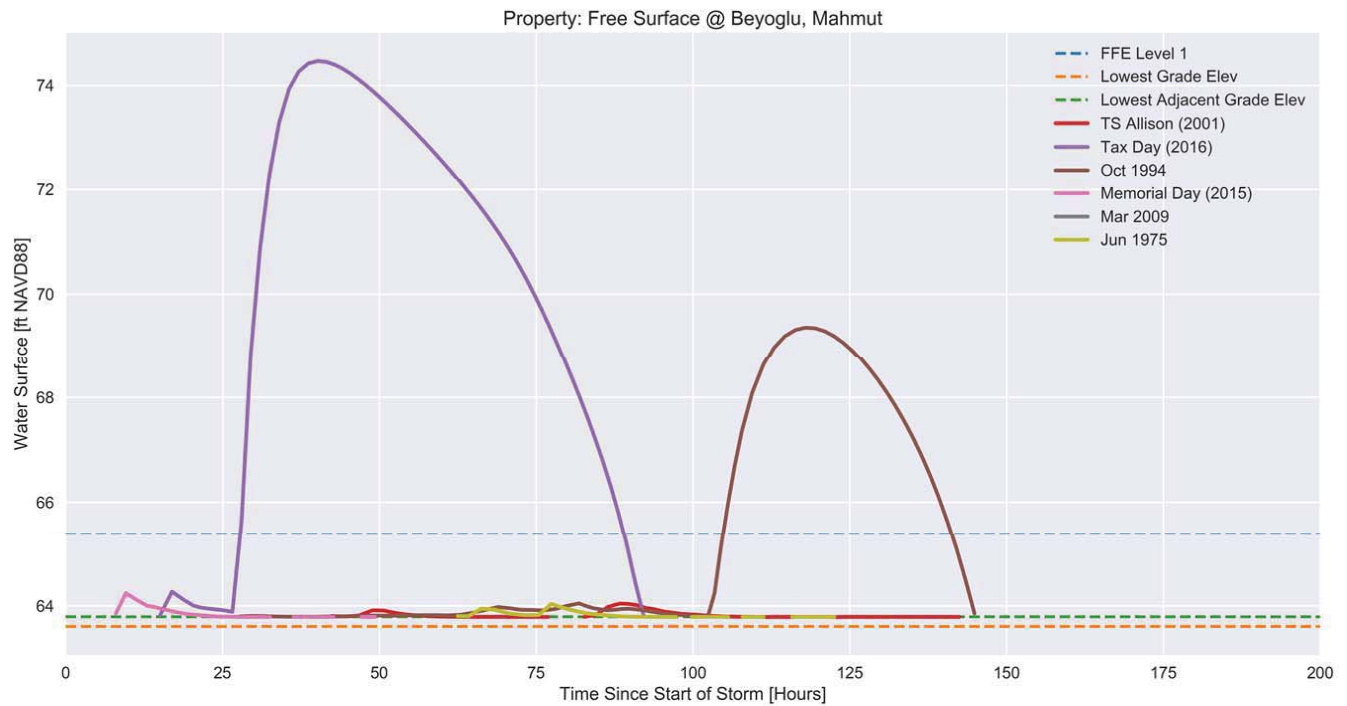


Figure C-39: Simulated free water surface elevations at Beyoglu, Mahmut (Historical Storms)

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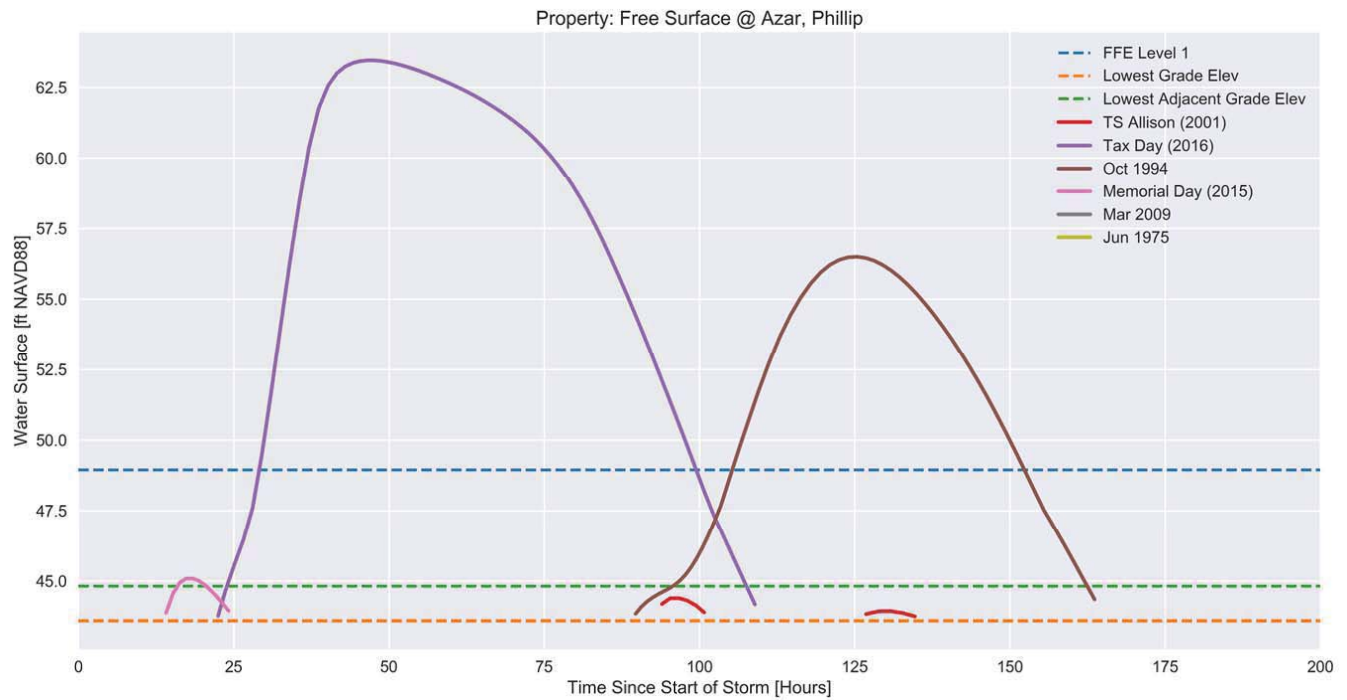


Figure C-40: Simulated free water surface elevations at Azar, Phillip (Historical Storms)

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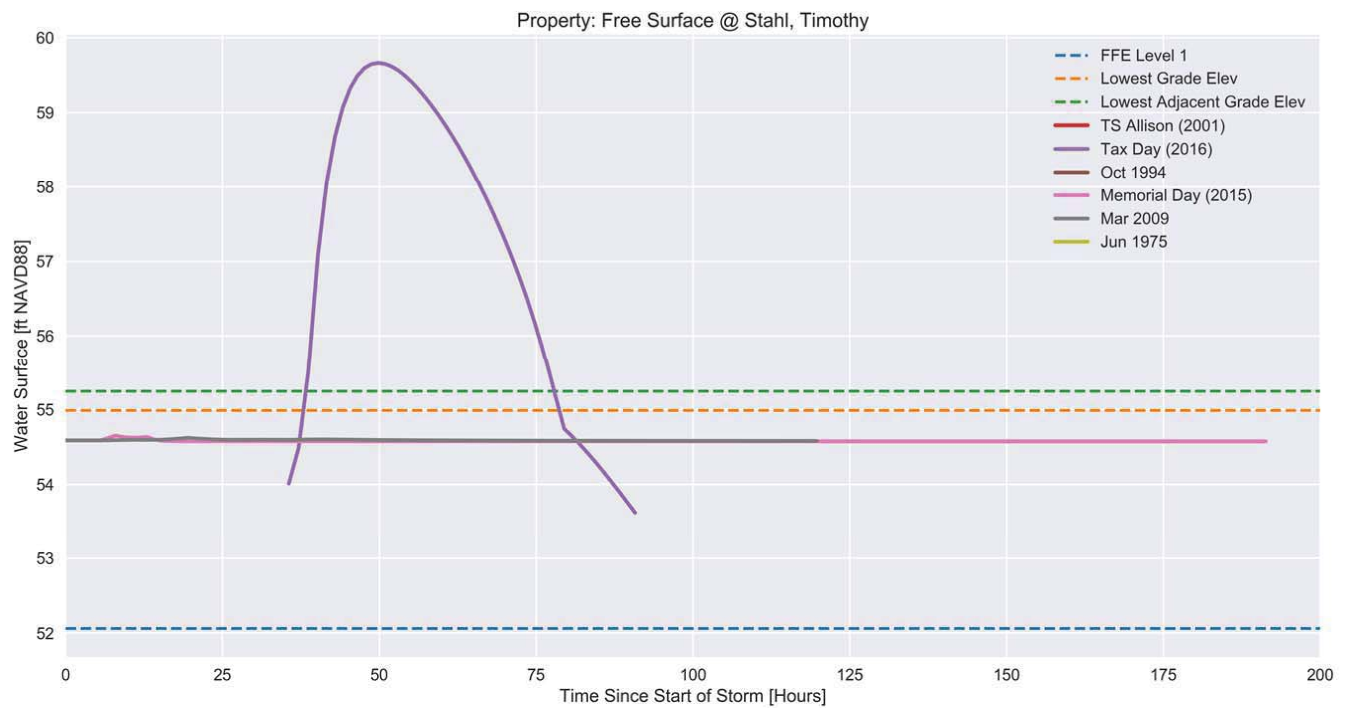


Figure C-41: Simulated free water surface elevations at Stahl, Timothy (Historical Storms)

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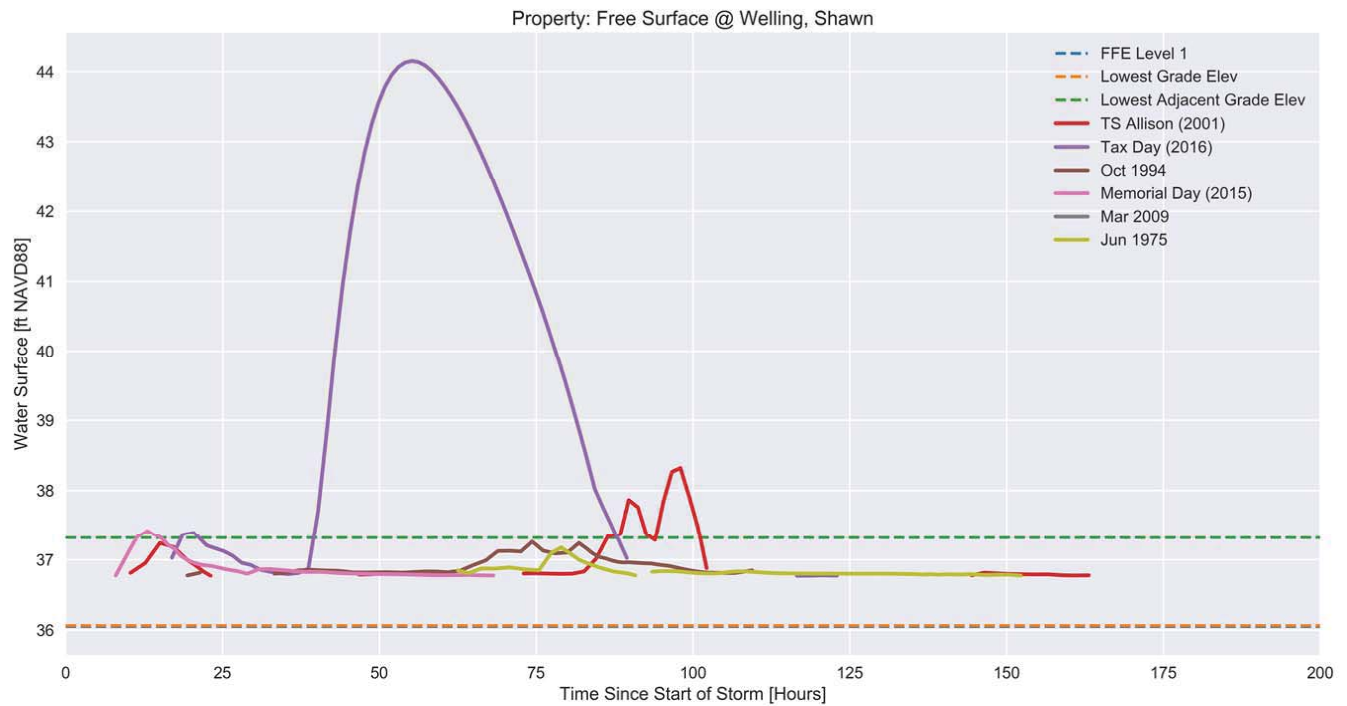


Figure C-42: Simulated free water surface elevations at Welling, Shawn (Historical Storms)

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Property Identification				Elevation Information (feet)					Gates Closed Run				
	Plaintiff	Address	UP/DOWN	Lowest Grade	Garage Elevation	Lowest Adjacent Grade	First Finished Floor	Second Finished Floor	Max Depth in First Finished Floor (feet)	Max Depth in First Finished Floor (inches)	Flooding duration in First Finished Floor	Flooding duration in First Finished Floor (hr)	Number of flooding times of first finished floor
1	Lakes on Eldridge		UP	106.3	-	108.4	108.9	-	1.1	13.7	9 day, 11 hr	227	1
2	Wind, Kurt & Jean		UP	106.9	108.6	108.2	109.2	109.3	0.9	10.5	6 day, 14 hr	158	1
3	Mitchell, Stewart	20323 Desert Willow Drive	UP	105.7	108.5	108.0	109.0	-	1.1	12.7	8 day, 14 hr	206	1
4	West Houston Airport Corp.	18000 Groeschke Road	UP	106.6	-	107.5	108.6		1.5	17.7	15 day, 11 hr	371	1
5	Mitchell, Mario		UP	119.9	121.5	121.1	121.9	-	1.8	21.3	1 day, 13 hr	37	1
6	Burnham, Elizabeth	15626 Four Season Drive	UP	102.6	105.0	104.0	105.5	-	4.5	54.5	17 day, 19 hr	427	1
7	Sidhu, Kulwant	16111 Aspenglenn Drive, Unit 603, Building F	UP	105.1	-	106.3	107.1	116.7	3.0	35.7	17 day, 10 hr	418	1
8	Turney, Robert	15910 Red Willow Drive	UP	101.7	104.2	103.8	104.7	-	5.4	65.0	17 day, 18 hr	426	1
9	Holland, Scott	1923 Wingleaf Drive	UP	106.1	107.4	107.2	107.8	-	2.2	26.9	17 day, 7 hr	415	1
10	Popovici, Catherine	19927 Parsons Green Court	UP	99.6	101.7	100.9	102.2	-	1.7	20.8	16 day, 21 hr	405	1
11	Soares, Elisio		UP	98.7	100.7	100.0	101.1	-	2.9	34.5	17 day, 6 hr	414	1
12	Micu, Christina	6411 Canyon Park Drive	UP	97.7	99.6	98.9	99.8	-	4.2	49.9	17 day, 21 hr	429	1
13	Giron, Juan & Ann	4310 Cassidy Park Lane	UP	99.0	101.0	100.2	101.0	101.5	2.9	35.1	18 day, 9 hr	441	1
14	Banker, Todd & Christina	4614 Kelliwood Manor Lane	UP	97.6	100.2	99.6	100.7	-	3.2	38.6	17 day, 9 hr	417	1
1	Aldred, Val & Linda	835 Thornvine Lane	DOWN	78.9	80.1	79.4	80.6	N/A	0.4	4.6	0 day, 10 hr	10	1
2	Good Resources, LLC	760 Memorial Mews St. #4	DOWN	75.1	-	77.8	78.5	87.4	No Flooding above Level 1	-	-	-	0
3	SMC Investment	777 S. Mayde Creek Drive	DOWN	72.4	78.2	73.5	77.2	77.3	No Flooding above Level 1	-	-	-	0
4	Milton, Arnold	850 Silvergate Drive	DOWN	76.3	78.6	78.0	78.5	78.6	No Flooding above Level 1	-	-	-	0
5	Shipos, Jennifer	931 Bayou Parkway	DOWN	78.2	80.5	80.2	80.9	-	No Flooding above Level 1	-	-	-	0
6	Hollis, Wayne	14914 River Forest	DOWN	74.5	76.7	75.2	76.6	-	No Flooding above Level 1	-	-	-	0
7	Silverman, Peter	12515 Westerley Lane	DOWN	73.4	75.2	74.4	75.0	-	No Flooding above Level 1	-	-	-	0
8	Godejard, Strause	14334 Heatherfield	DOWN	68.5	73.5	72.8	73.7	-	No Flooding above Level 1	-	-	-	0
9	Cutts, Paul	311 Blue Willow Drive	DOWN	68.8	71.1	69.9	71.7	-	No Flooding above Level 1	-	-	-	0
10	Ho, Becky		DOWN	69.2					No Flooding above Level 1				
11	Beyoglu, Mahmut	107 Warrenton Drive	DOWN	63.6	64.8	63.8	65.4	-	1.0	12.6	0 day, 21 hr	21	2
12	Azar, Phillip	3 Magnolia Bend	DOWN	43.6	48.1	44.8	48.9	-	8.5	102.3	2 day, 5 hr	53	1
13	Stahl, Timothy	265 Chimney Rock Road	DOWN	55.0	55.4	55.2	52.1	55.9	2.8	33.6	0 day, 17 hr	17	3
14	Welling, Shawn	5731 Logan Lane	DOWN	36.1	46.8	37.3	36.0	47.4	8.8	105.5	2 day, 2 hr	50	1

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In Re: UPSTREAM)
ADDICKS AND BARKER)
(TEXAS) FLOOD-CONTROL) Sub-Master Docket No
RESERVOIRS) 17-9001L
_____))
_____))
THIS DOCUMENT APPLIES)
TO:)
_____))
ALL UPSTREAM CASES)

ORAL AND VIDEOTAPED DEPOSITION OF

BARRY KEIM

DECEMBER 6, 2018

ORAL DEPOSITION OF BARRY KEIM, produced as
a witness at the instance of Plaintiff and
duly sworn, was taken in the above styled and
numbered cause on December 6, 2018, from 9:31
a.m. to 10:44 a.m., before KATERI A.
FLOT-DAVIS, CSR, CCR in and for the State of
Texas, reported by machine shorthand, at the
offices of Williams Kherkher Hart Boundas,
8441 Gulf Freeway, Houston, Texas, pursuant to
the Federal Rules of Civil Procedure and the
provisions stated on the record herein.

1 legal conclusion. 2 You can answer. 3 THE WITNESS: Give me the question 4 again, now. 5 MR. VUJASINOVIC: I'll rephrase it. 6 THE WITNESS: What is the relevance 7 of those cites? Is that what you're 8 asking? 9 Q. (BY MR. VUJASINOVIC) Yes. 10 I mean, how is it relevant to you, 11 what amount of rainfall or flooding occurred 12 in Nederland or Grove, Texas? 13 A. Well, it's the fact that that's the 14 highest point rainfalls that occurred in 15 Hurricane Harvey. 16 Q. Yeah, but do you know where those 17 towns are? 18 A. Like, 10 to 15 miles southeast of 19 Beaumont. 20 Q. Over 100 miles from reservoirs. 21 A. Sure. 22 Q. So how is that relevant to any of 23 your opinions? 24 A. Well, it's relevant from the 25 perspective that Harvey was an unprecedented	1 MS. HELD: Objection. Asked and 2 answered. 3 THE WITNESS: Yes. 4 MR. VUJASINOVIC: You want to take 5 a break for a minute? 6 MS. HELD: Sure. 7 THE VIDEOGRAPHER: We are off the 8 record at 10:38 a.m. 9 (Brief Recess Taken.) 10 THE VIDEOGRAPHER: We're on the 11 record at 10:43 a.m. 12 MR. VUJASINOVIC: We'll save the 13 remainder of our questions for trial. 14 Pass the witness. 15 MR. NOLEN: Downstream will reserve 16 questions until the time of trial. 17 MS. HELD: No, I don't think we 18 have any follow-up. 19 THE VIDEOGRAPHER: We are off the 20 record at 10:44 a.m. That concludes 21 this deposition. 22 MR. VUJASINOVIC: Thanks for your 23 time, sir. 24 THE WITNESS: Thank you. 25 (Deposition concluded.)
Page 74	Page 76
1 rainfall event for the region. 2 Q. But in terms of specifically 3 anything that happened upstream or downstream 4 Addicks Barker, it would be not relevant, you 5 agree with that? 6 A. Correct. I agree with that, yes. 7 Q. How many of the 24 rain gauges that 8 are used to determine annual accedence in the 9 term periods are actually within the Addicks 10 or Barker watersheds? 11 A. My recollection is it was 21 or 22. 12 I think there were -- there were two or three 13 that were right on the -- you know, either 14 right outside the basin or right on the basin 15 boundary. 16 Q. A rain event similar to Harvey will 17 inevitably occur in the area of the Barker and 18 Addicks Reservoirs, true? 19 A. Given enough time, yes. It could 20 be many thousands of years. It could be -- it 21 could be next week. 22 Q. Right. 23 A. But it's pretty rare. 24 Q. But it will inevitably occur, 25 right?	1 CHANGES AND SIGNATURE 2 WITNESS NAME: BARRY KEIM 3 DATE OF DEPOSITION: DECEMBER 6, 2018 4 PAGE LINE CHANGE REASON 5 _____ 6 _____ 7 _____ 8 _____ 9 _____ 10 _____ 11 _____ 12 _____ 13 _____ 14 _____ 15 _____ 16 _____ 17 _____ 18 _____ 19 _____ 20 _____ 21 _____ 22 _____ 23 _____ 24 _____ 25 _____
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Jeff Lindner

1

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re DOWNSTREAM ADDICKS)	Sub-Master Docket
AND BARKER (TEXAS))	No. 1:17-9002 L
FLOOD-CONTROL RESERVOIRS)	
)	Chief Judge Susan G. Braden
)	
THIS DOCUMENT RELATES TO:)	
)	
ALL DOWNSTREAM CASES)	

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

In re UPSTREAM ADDICKS)	Sub-Master Docket
AND BARKER (TEXAS))	No. 17-9001L
FLOOD-CONTROL RESERVOIRS)	
)	Judge Charles F. Lettow
)	
THIS DOCUMENT RELATES TO:)	
)	
ALL UPSTREAM CASES)	

Jeff Lindner

<p style="text-align: right;">2</p> <p>1 ORAL VIDEOTAPED DEPOSITION</p> <p>2 JEFF LINDNER</p> <p>3 SEPTEMBER 24, 2018</p> <p>4</p> <p>5 ORAL VIDEOTAPED DEPOSITION OF JEFF LINDNER, produced</p> <p>6 as a witness at the instance of the Individual</p> <p>7 Downstream Plaintiffs and duly sworn, was taken in the</p> <p>8 above-styled and numbered cause on the 24th day of</p> <p>9 September, 2018, from 9:38 a.m. to 4:58 p.m., before</p> <p>10 Melinda Barre, Certified Shorthand Reporter in and for</p> <p>11 the State of Texas, reported by computerized stenotype</p> <p>12 machine at the offices of Harris County Flood Control</p> <p>13 District, 9900 Northwest Freeway, Houston, Harris</p> <p>14 County, Texas, pursuant to the Federal Rules of Civil</p> <p>15 Procedure and the provisions stated on the record or</p> <p>16 attached hereto.</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p style="text-align: right;">4</p> <p>1 APPEARANCES</p> <p>2 FOR MEMORIAL SMC TEST PROPERTY:</p> <p>3 Ms. Deborah C. Milner</p> <p>4 VINSON & ELKINS, LLP</p> <p>5 1001 Fannin, Suite 2500</p> <p>6 Houston, Texas 77002-6760</p> <p>7 Telephone: 713.230.2000</p> <p>8 E-mail: cmlner@velaw.com</p> <p>9 FOR THE UNITED STATES DEPARTMENT OF JUSTICE:</p> <p>10 Ms. Kristine Tardiff</p> <p>11 U.S. DEPARTMENT OF JUSTICE</p> <p>12 Ben Franklin Station</p> <p>13 P.O. Box 7611</p> <p>14 Washington, D.C. 20004-7611</p> <p>15 Telephone: 202.305.0481</p> <p>16 E-mail: kristine.tardiff@usdoj.gov</p> <p>17</p> <p>18 FOR UPSTREAM INDIVIDUAL PLAINTIFFS AS TO PRE-TRIAL</p> <p>19 DISCOVERY AND DISPOSITIVE MOTIONS:</p> <p>20 Mr. Larry Dunbar</p> <p>21 DUNBAR HARDER, PLLC</p> <p>22 10590 Westoffice Drive, Suite 2000</p> <p>23 Houston, Texas 77056</p> <p>24 Telephone: 713.782.4646</p> <p>25 E-mail: ldunbar@dunbarharder.com</p> <p>FOR UPSTREAM INDIVIDUAL PLAINTIFFS AS TO JURISDICTIONAL</p> <p>DISCOVERY, MOTION TO DISMISS, AND SCHEDULING:</p> <p>Mr. Job Tennant</p> <p>VB ATTORNEYS</p> <p>6363 Woodway Drive, Suite 400</p> <p>Houston, Texas 77057</p> <p>Telephone: 713.224.7800</p> <p>E-mail: job@vbattorneys.com</p>
<p style="text-align: right;">3</p> <p>1 APPEARANCES</p> <p>2 FOR INDIVIDUAL DOWNSTREAM PLAINTIFFS AS TO</p> <p>3 JURISDICTIONAL DISCOVERY, THE GOVERNMENT'S MOTION</p> <p>4 TO DISMISS, AND SCHEDULING:</p> <p>5 Mr. Jack E. McGehee</p> <p>6 Mr. H.C. Chang</p> <p>7 Mr. Benjamin C. Feiler</p> <p>8 McGEHEE CHANG LANDGRAF</p> <p>9 10370 Richmond Avenue, Suite 1300</p> <p>10 Houston, Texas 77042</p> <p>11 Telephone: 713.864.4000</p> <p>12 E-mail: jmcgehee@lawtx.com</p> <p>13 FOR INDIVIDUAL DOWNSTREAM PLAINTIFFS AS TO</p> <p>14 JURISDICTIONAL DISCOVERY, THE GOVERNMENT'S MOTION</p> <p>15 TO DISMISS, AND SCHEDULING:</p> <p>16 Mr. Jacob E. Hartman</p> <p>17 Mr. Daniel Severson</p> <p>18 KELLOGG, HANSEN, TODD, FIGEL & FREDERICK, PLLC</p> <p>19 1615 M Street, N.W., Suite 400</p> <p>20 Washington, D.C. 20036</p> <p>21 Telephone: 202.326.7970</p> <p>22 E-mail: jhartman@kellogghansen.com</p> <p>23</p> <p>24 FOR DOWNSTREAM PRE-TRIAL DISCOVERY, DISPOSITIVE MOTIONS,</p> <p>25 AND/OR TRIAL ON LIABILITY, AND SCHEDULING:</p> <p>Mr. Rand P. Nolen</p> <p>FLEMING NOLEN JEZ, L.L.P.</p> <p>2800 Post Oak Boulevard, Suite 4000</p> <p>Houston, Texas 77056-6109</p> <p>Telephone: 713.621.7944</p> <p>E-mail: rand_nolen@fleming-law.com</p>	<p style="text-align: right;">5</p> <p>1 APPEARANCES</p> <p>2 FOR HARRIS COUNTY FLOOD CONTROL DISTRICT:</p> <p>3 Ms. Laura Fiorentino Cahill</p> <p>4 ASSISTANT COUNTY ATTORNEY</p> <p>5 9900 Nothwest Freeway</p> <p>6 Houston, Texas 77092</p> <p>7 Telephone: 713.684.4164</p> <p>8 E-mail: laura.cahill@hccd.org</p> <p>9 ALSO PRESENT: Jordan Poole, Videographer</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>

2 (Pages 2 to 5)

Jeff Lindner

<p style="text-align: right;">10</p> <p>1 Q. Show the Court the extent of the federal water 2 inundation. 3 A. On the upstream or the downstream? 4 Q. Downstream. 5 A. On the downstream side? 6 Q. Yes, sir. 7 A. Without the mapping I just know federal water 8 was in this area through about right through here. I 9 mean, the federal water itself went all the way down 10 because it flowed down the entire channel. 11 Q. Okay. 12 A. But if you're speaking of -- are you speaking 13 of inundation outside the banks of the bayou? 14 Q. Yes, sir. 15 A. So roughly from about the Gessner/Blalock area 16 upstream, there would have been inundation outside of 17 the banks. 18 Q. And we could actually measure the inundation of 19 federal water at the Piney Point gauge. Are you 20 familiar with that? 21 A. We measured -- the USGS, the United States 22 Geological Survey, measures both stage and discharge at 23 the Piney Point gauge, which is the control point for 24 the releases at Addicks and Barker. So the individuals 25 operating these reservoirs use Piney Point as the</p>	<p style="text-align: right;">12</p> <p>1 A. To release water? 2 Q. Yes, sir. 3 A. Okay. I became aware at -- there was an e-mail 4 sent on the evening of Sunday, August the 27th, at 5 11:59. And that's when the Corps indicated that they 6 would start releasing water from Addicks and Barker. 7 Q. An e-mail -- and say the date again. 8 A. It was Sunday, August the 27th. 9 Q. Okay. 10 A. At 11:59, right before midnight. That's when 11 they sent an e-mail saying that they were going to be 12 opening the floodgates and releasing water. 13 Q. Did you know before that that the Corps had an 14 inundation map that actually showed the extent of 15 inundation that they expected from induced surcharge? 16 A. Yes. 17 Q. And when did you become aware of that? 18 A. These are maps that have been -- these are maps 19 that were created in the Addicks/Barker Emergency 20 Coordination Team, ABECT. This is a team that was set 21 up after Hurricane Katrina when the Corps was studying 22 all high-hazard dams in the United States. 23 So there's multiple agencies on this team, 24 the Harris County Flood Control District among others. 25 And inundation maps were created out of that team that</p>
<p style="text-align: right;">11</p> <p>1 control. 2 Q. When did you first learn -- first of all, are 3 you familiar with the definition of "induced surcharge"? 4 A. I'll need you to define that. I have heard of 5 it. 6 Q. Well, that's good. I will define it for you. 7 My next question is going to be did you know what that 8 definition was on August 27th. But let me tell you what 9 induced surcharge is. It's part of the Corps of 10 Engineers' water control manual that says in certain 11 circumstances -- based on rate of rise and elevation in 12 the reservoir in certain circumstances these release 13 gates will be opened for dam protection and for 14 protection of Downtown Houston and the Ship Channel. 15 Are you familiar -- will you accept that 16 as a definition? 17 A. Yeah, absolutely. 18 Q. When did you first here the word "induced 19 surcharge"? 20 A. I had never heard induced. I have heard just 21 surcharge before. Never heard induced. 22 Q. Okay. When were you aware -- now that you know 23 the definition of induced surcharge, when did you become 24 aware that the Corps was going to implement induced 25 surcharge?</p>	<p style="text-align: right;">13</p> <p>1 we all had access to or we had been given. They weren't 2 all for releases; some of it was for different 3 information, for example, a breach or a failure or water 4 going around the ends of the spillways of the dams. So 5 it wasn't just releases. However, if you just look at 6 the cubic-feet-per-second flow down Buffalo Bayou, there 7 was maps that showed at this cubic feet per second, this 8 is what would be inundated. 9 So regardless of how the cubic feet per 10 second got there, there were maps showing at this cubic 11 feet per second this is what will be flooded. 12 Q. Were you part of the discussion whether or not 13 the Corps should follow the water control manual with 14 respect to induced surcharge? 15 A. No. 16 Q. And you said 11:29 August 27th -- 17 A. 11:59. 18 Q. 11:59 August 27th. Is that 2359? 19 A. Yes. 20 Q. So right at midnight -- 21 A. Right. 22 Q. -- on the 27th. Were there ever any -- I'm 23 going to use air quotes -- emergency procedures 24 implemented? Was the emergency protocol implemented by 25 the Corps with respect to notifying Harris County Flood</p>

4 (Pages 10 to 13)

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<p style="text-align: right;">34</p> <p>1 the water and the, I believe, sewage of the subdivision.</p> <p>2 That's my extent of knowledge.</p> <p>3 Q. And they want water to flow safely?</p> <p>4 A. I don't know.</p> <p>5 Q. Part of that is -- part of the purpose for the</p> <p>6 M.U.D. regulations is to control floodwater?</p> <p>7 A. I don't know.</p> <p>8 Q. Okay.</p> <p>9 A. I don't know.</p> <p>10 Q. Builders. Harris County has building codes for</p> <p>11 builders?</p> <p>12 A. (Witness nods head affirmatively.)</p> <p>13 Q. We talked about elevation. Are there any other</p> <p>14 building codes that you could imagine or that are likely</p> <p>15 if there's no dam?</p> <p>16 MS. CAHILL: Objection, hypothetical.</p> <p>17 Q. (By Mr. McGehee) Hypothetically?</p> <p>18 A. If there are no dams, I don't know. Like we</p> <p>19 talked about with the projects in the bayous and levees,</p> <p>20 there would have to be an engineering analysis to</p> <p>21 determine what could be impacted if there were no dams</p> <p>22 there. And then there would possibly have to be some</p> <p>23 type of codes for that.</p> <p>24 Q. Okay. Elevation would be one of those types of</p> <p>25 codes?</p>	<p style="text-align: right;">36</p> <p>1 today if there were no Addicks/Barker dam. Fair?</p> <p>2 MS. CAHILL: Objection, hypothetical.</p> <p>3 A. I wouldn't say that, no.</p> <p>4 Q. (By Mr. McGehee) Okay. I think you said</p> <p>5 before -- and I'm going to go back to a previous</p> <p>6 question. If these gates had never been opened, I think</p> <p>7 you said before that there would have been more water</p> <p>8 that flowed into the Spring Valley area. Is that right?</p> <p>9 A. Yes.</p> <p>10 Q. How would it get there?</p> <p>11 A. This is the end of -- the north end spillway,</p> <p>12 also known as the emergency spillway or the auxiliary</p> <p>13 spillway. So water will either run around it or, as the</p> <p>14 water gets higher, it can go over the top of it.</p> <p>15 So in this particular case water -- what</p> <p>16 happened with Harvey is water got to 109 feet. The</p> <p>17 ground elevation where that spillway ties into the</p> <p>18 ground is 108. So about a foot of water came around the</p> <p>19 end of it. The water didn't in this case go over the</p> <p>20 top of the concrete spillway. But there was a Corps of</p> <p>21 Engineers forecast at some point either on Sunday or</p> <p>22 Monday that was forecasting the pool of Addicks to reach</p> <p>23 112.4.</p> <p>24 So if the natural ground elevation here is</p> <p>25 108 and the forecast was 112.4, about 4-1/2 feet of</p>
<p style="text-align: right;">35</p> <p>1 A. Elevation, yes.</p> <p>2 Q. How about material?</p> <p>3 A. I don't know.</p> <p>4 Q. Are you familiar with any state projects that</p> <p>5 involve drainage districts from the State?</p> <p>6 A. No.</p> <p>7 Q. How about levee improvement districts?</p> <p>8 A. No.</p> <p>9 Q. Stormwater control districts?</p> <p>10 A. No.</p> <p>11 Q. Do you work at all with the Texas Commission on</p> <p>12 Environmental Quality?</p> <p>13 A. Me personally, not really, no.</p> <p>14 Q. What do you think their role is as far as flood</p> <p>15 control goes?</p> <p>16 A. To my knowledge, they don't have a role.</p> <p>17 They're mainly water quality. At least that's the way I</p> <p>18 understand what they do, water quality.</p> <p>19 Q. Describe the City of Houston's mission as far</p> <p>20 as flood control goes.</p> <p>21 A. My understanding of what the City is</p> <p>22 responsible for when it comes to drainage is the</p> <p>23 roadside ditch drainage and the underground drainage</p> <p>24 system within the city limits of Houston.</p> <p>25 Q. And all those drainage needs would be different</p>	<p style="text-align: right;">37</p> <p>1 water would have been coming around the top of the</p> <p>2 spillway. And we did have some engineering consultants</p> <p>3 use that 112.4 and then turn the water loose and let it</p> <p>4 go to see where it would go because we weren't sure</p> <p>5 about how it was going to interact with all the</p> <p>6 buildings and subdivisions, detention basins, roadside</p> <p>7 ditch systems that are in this part of the area right</p> <p>8 here.</p> <p>9 So their modeling showed that much of this</p> <p>10 area would be inundated with water -- again, this is at</p> <p>11 the 112.4 -- and that water would have cut through the</p> <p>12 Beltway underpasses here and flowed down through</p> <p>13 portions of Spring Valley.</p> <p>14 Q. Take the far right portion of Spring Valley.</p> <p>15 Do you have any idea what the time of concentration was</p> <p>16 from the time it spills over here until the time it</p> <p>17 hits, say, Hilshire Village?</p> <p>18 A. I don't know.</p> <p>19 Q. It wouldn't be instantaneous?</p> <p>20 A. No.</p> <p>21 Q. If they hadn't opened the gates and the water</p> <p>22 spilled as you just described, it would -- this question</p> <p>23 may answer itself, but the homes damaged from the</p> <p>24 induced surcharge would not have received induced</p> <p>25 surcharge damage?</p>

10 (Pages 34 to 37)

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<p style="text-align: right;">70</p> <p>1 statement attributed to her that -- to establish</p> <p>2 permanent liaisons. Later she says that they wanted to</p> <p>3 develop push notifications. That would be in</p> <p>4 anticipation of other extreme flooding events happening</p> <p>5 in the future, correct?</p> <p>6 A. Possibly.</p> <p>7 Q. Why else would you need that?</p> <p>8 A. I mean, the establishment of permanent liaisons</p> <p>9 would be something that you could use or utilize during</p> <p>10 a lesser event that I would consider an extreme event.</p> <p>11 Q. Okay.</p> <p>12 A. So if Highway 6 is impacted or Westheimer</p> <p>13 Parkway is impacted, you could still utilize a liaison</p> <p>14 to work with you to make sure that communication is</p> <p>15 what's happening, what's expected to happen. But it may</p> <p>16 not impact anybody.</p> <p>17 Q. Okay.</p> <p>18 A. Push notifications probably would be an extreme</p> <p>19 type of an event where you're actually telling somebody</p> <p>20 something is going to happen.</p> <p>21 Q. It says here, Alicia says, "We have already</p> <p>22 briefed the White House of developing a method to push</p> <p>23 notifications out to everyone." So that would be for an</p> <p>24 extreme event?</p> <p>25 A. Yeah. I assume she's talking about the</p>	<p style="text-align: right;">72</p> <p>1 A. There might have been some people on the phone,</p> <p>2 but I was in person there.</p> <p>3 Q. Okay. And then if you turn to the last page,</p> <p>4 which is Bates No. 8155, there's a quote attributed to</p> <p>5 you where again you're talking about, "The biggest</p> <p>6 problem for us, HCFCD, was communications with y'all.</p> <p>7 If we are going continue to do this group, what is the</p> <p>8 point of this group?"</p> <p>9 The intent was to continue the group?</p> <p>10 A. Yes.</p> <p>11 Q. And why would it be necessary to continue the</p> <p>12 group?</p> <p>13 A. Well, this group's been there for ten years;</p> <p>14 and the reason to continue it is to increase the</p> <p>15 effectiveness of communication between all these</p> <p>16 partners when there are issues or concerns at Addicks</p> <p>17 and Barker.</p> <p>18 Q. Okay. If you look a couple rows down, there's</p> <p>19 a statement attributed to Coraggio. I believe that's</p> <p>20 Maglio Coraggio. Is that correct?</p> <p>21 A. Yes.</p> <p>22 Q. Who is that?</p> <p>23 A. He works at the Corps. I don't know exactly</p> <p>24 what his title is.</p> <p>25 Q. Have you interacted with him before?</p>
<p style="text-align: right;">71</p> <p>1 wireless emergency alerts that is able to be utilized</p> <p>2 where a government agency can push out messages to cell</p> <p>3 phones that aren't necessarily -- it's not an opt-in</p> <p>4 system. You can hit every cell phone regardless.</p> <p>5 But I don't know if that's what she's</p> <p>6 talking about, but I know that's one of the things</p> <p>7 Harris County is looking at.</p> <p>8 Q. Did that exist at the time of Hurricane Harvey?</p> <p>9 A. It did exist, but it was not able to be -- you</p> <p>10 couldn't draw a polygon and hit just a certain area. My</p> <p>11 understanding at the time of Harvey was that you could</p> <p>12 only warn a fairly large area or county-size area. And</p> <p>13 that would have been overwarning a significant number of</p> <p>14 people and especially individuals who did not understand</p> <p>15 Addicks/Barker where releases were. So you would have</p> <p>16 had a lot of people getting a message that didn't apply</p> <p>17 to them, which is why we did not use it.</p> <p>18 But going forward, my understanding is</p> <p>19 that this system will have the capability to draw a</p> <p>20 specific polygon; and then we can hit what we want to</p> <p>21 hit with that message.</p> <p>22 Q. Okay. As a general matter, was this meeting</p> <p>23 conducted over the phone or was it in person?</p> <p>24 A. This was in person.</p> <p>25 Q. In person?</p>	<p style="text-align: right;">73</p> <p>1 A. Uh-huh.</p> <p>2 Q. What role does he play even if you don't know</p> <p>3 his title?</p> <p>4 A. I don't know if he's a project manager. I know</p> <p>5 he's an engineer. I don't know what exactly his title</p> <p>6 is for like Addicks and Barker.</p> <p>7 Q. Okay. He says, and I quote, "I'd like to have</p> <p>8 an exercise where we walk through an event with everyone</p> <p>9 involved, PAO, et cetera and actually talk about</p> <p>10 surcharge release, notifications and communications."</p> <p>11 So he would be saying that because he</p> <p>12 anticipates that surcharge releases would occur again in</p> <p>13 the future?</p> <p>14 MS. CAHILL: Form.</p> <p>15 A. It could happen again.</p> <p>16 Q. (By Mr. Severson) Thank you. Then at the very</p> <p>17 bottom it says "time for next meeting, mid June before</p> <p>18 the 16th."</p> <p>19 A. Uh-huh.</p> <p>20 Q. Do you know if that meeting occurred?</p> <p>21 A. There was a meeting. I don't remember when it</p> <p>22 was. There's actually been two meetings since then.</p> <p>23 Q. Two meetings since April?</p> <p>24 A. Yeah.</p> <p>25 Q. And did you attend both of those meetings?</p>

19 (Pages 70 to 73)

But I think a lot of the focus is going to be on the communications side. That was kind of my emphasis with this is we need to work on the communications side.

A. Yes.

Anytime we have a really big event, we usually partner; and he does more of the engineering stuff. There's pages in here at the back that says this is what HCFC projects prevented from happening, stuff like that, stuff that I'm not as versed in. He'll put those paragraphs in.

Q. And it says that there's HCFC regional project and a federal project. And there were partial excavation of six regional and one federal detention

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Jeff Lindner

<p style="text-align: right;">250</p> <p>1 operations center why you weren't getting more specifics</p> <p>2 before that evening as to a quantity?</p> <p>3 A. I don't know. And I would go further and say</p> <p>4 the Corps liaisons that were in the room with me sitting</p> <p>5 right behind me did not have really any better</p> <p>6 information either.</p> <p>7 Q. You talked about some of the outreach that you</p> <p>8 have done in one of the upstream neighborhoods. What</p> <p>9 neighborhood was that, do you recall?</p> <p>10 A. Cinco Ranch.</p> <p>11 Q. Cinco Ranch. Thank you. When was that</p> <p>12 presentation? You said it was on hurricane</p> <p>13 preparedness?</p> <p>14 A. It was on hurricane preparedness. It was the</p> <p>15 summer of, I believe, 2016. It was after the tax day</p> <p>16 storm.</p> <p>17 Q. Okay. All right. And is that the first time</p> <p>18 you recall in kind of a public presentation talking</p> <p>19 about in that particular situation Barker and the Barker</p> <p>20 pool and the potential for flooding outside the</p> <p>21 government-owned land?</p> <p>22 A. I spent a lot of time on it in that</p> <p>23 presentation because that is an area that is going to</p> <p>24 be -- that could potentially be directly impacted by it.</p> <p>25 I'm sure I mentioned it in other presentations. I'm not</p>	<p style="text-align: right;">252</p> <p>1 of, This is what happened. It's factual. This is how</p> <p>2 high Addicks got; this is how high Barker got; this is</p> <p>3 the releases. It's pictures showing it and then also</p> <p>4 showing how the water came out of the north end of</p> <p>5 Addicks spillway and what could have happened if the</p> <p>6 pool had reached 112.4 feet.</p> <p>7 So it is generally just a factual</p> <p>8 presentation of what happened about the whole Harvey</p> <p>9 storm. It doesn't just focus on Addicks/Barker. It's</p> <p>10 the whole county.</p> <p>11 Q. Okay. Is a component of that presentation that</p> <p>12 you're doing, either the ones you were doing post tax</p> <p>13 day flood or now post Harvey, is there still a public</p> <p>14 education component to that in terms of educating people</p> <p>15 about flood risk?</p> <p>16 A. Yes.</p> <p>17 Q. I don't think I have any further questions for</p> <p>18 now.</p> <p>19 MR. McGEHEE: I just have a few follow-up</p> <p>20 based on what she asked. I'll be real quick. I'm going</p> <p>21 to jump around. I have about three points for me.</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
<p style="text-align: right;">251</p> <p>1 sure I had a slide about it, but I might have mentioned</p> <p>2 that there are homes in these flood pools that could be</p> <p>3 flooded.</p> <p>4 Q. And did you get any questions from attendees at</p> <p>5 that presentation about that aspect?</p> <p>6 A. At the Cinco Ranch one?</p> <p>7 Q. Yes.</p> <p>8 A. I don't remember getting any questions, no.</p> <p>9 Q. And following the tax day flood did you give</p> <p>10 that similar presentation to any other neighborhood</p> <p>11 around the Barker Reservoir?</p> <p>12 A. No.</p> <p>13 Q. And any similar presentation to neighborhoods</p> <p>14 upstream of Addicks?</p> <p>15 A. Not that I recall, no.</p> <p>16 Q. Okay. Any similar presentations either before</p> <p>17 or after Harvey to neighborhoods that are downstream of</p> <p>18 the reservoirs?</p> <p>19 A. I've given numerous presentations after Harvey</p> <p>20 to subdivisions downstream of the reservoirs, yes.</p> <p>21 Q. Describe for me kind of the content of those</p> <p>22 presentations and what points you're trying to cover.</p> <p>23 A. Generally it's just a presentation about</p> <p>24 Harvey, what happened. And there are a handful of</p> <p>25 slides, I'd say two or three slides, in there that speak</p>	<p style="text-align: right;">253</p> <p>1 RE-EXAMINATION</p> <p>2 QUESTIONS BY MR. McGEHEE:</p> <p>3 Q. You talked to Chris about when you found out</p> <p>4 about the release and you didn't realize the extent of</p> <p>5 the release, when you were notified. And I think you</p> <p>6 told me it was at about midnight on the 27th, correct?</p> <p>7 A. 11:59.</p> <p>8 Q. Going back to then, had you been told that the</p> <p>9 release would be the biggest release they ever made in</p> <p>10 the history of the dams and the release would be 16,000</p> <p>11 CFS --</p> <p>12 A. No.</p> <p>13 Q. No. Had you been told that, would you have</p> <p>14 alerted downstream property owners that more folks would</p> <p>15 be flooded?</p> <p>16 MS. CAHILL: Objection, speculation.</p> <p>17 A. Yes.</p> <p>18 Q. (By Mr. McGehee) How come?</p> <p>19 A. Because we would have had hard numbers to go by</p> <p>20 and we could have then mapped that release with what was</p> <p>21 already in Buffalo Bayou and had inundation mapping. We</p> <p>22 probably could have done the same thing we did on the</p> <p>23 upstream portion and labeled out the neighborhoods that</p> <p>24 would have been impacted by that amount of release.</p> <p>25 Q. And to your credit, if you knew that additional</p>

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<p style="text-align: right;">254</p> <p>1 homes then would be flooded with federal water, you felt 2 like it was your job to notify the property owners? 3 A. It is the job of the Harris County Flood 4 Control District to notify of impacts. 5 Q. You said it kept raining, and you said 6 throughout this deposition it kept raining and kept 7 raining. I have the impression it's still raining out 8 there now. The intense rainfall, did the intense 9 rainfall subside on the 28th? 10 A. Yes. 11 Q. And we have pictures of the 29th where the 12 sun's out. Is it fair to say that it stopped raining on 13 the 29th? 14 A. No. 15 Q. How much rain came on the 29th? Much? 16 A. There was still another on average 6 to in some 17 cases 20 inches that fell on the 29th and the 30th, 18 mainly focused down in the southeast part of Harris 19 County. 20 Q. That's just what I was going to ask. If we 21 could pull the map up here. If we look at the areas 22 that both upstream and downstream are interested in, 23 this area that I'm pointing to right here, the great 24 intensity of the rainfall subsided on the 28th, subsided 25 even more on the 29th. Is that fair?</p>	<p style="text-align: right;">256</p> <p>1 bit wrong, but I'll ask that you help me. You said the 2 way you identify -- I think the way you identify flooded 3 homes, the way you identify flooded homes is -- and I 4 think you called it data collection where you take your 5 stream gauge, you measure high-water marks, you have 6 surveys and you can use that to figure out which homes 7 flooded? 8 A. No. 9 Q. Okay. Tell me about that. Tell me one way to 10 figure out -- 11 A. The way we identify flooded homes is damage 12 assessment teams go out and physically look for signs of 13 flood damage at properties. 14 Q. So are you familiar with HEC-RAS models that 15 project flooded homes and project which homes were 16 flooded only because of the release? 17 A. Well, the HEC-RAS model doesn't do that. The 18 HEC-RAS model will give you a water surface elevation, 19 and then you can plot that across LIDAR data which would 20 show you a plain or area that could be inundated with 21 water. 22 Q. Fair enough. Let me go with what you just 23 said. To determine whether homes had been flooded or 24 whether they would have been flooded, which is more 25 accurate, HEC-RAS modeling or observation?</p>
<p style="text-align: right;">255</p> <p>1 A. Yes. 2 Q. And then it was dry for about ten days? 3 A. Oh, you mean it didn't rain for ten days? 4 Q. Yes, sir. 5 A. Yes. Once the rain stopped, it did not rain 6 again for an extended period. 7 Q. Let me jump around. It's a good sign. In your 8 opinion, everybody's at risk for flood? 9 A. Yes. 10 Q. You base that on flood mapping; you base that 11 on inundation models; you base that on your experience? 12 A. Experience. 13 Q. How long have those flood inundation models and 14 flood models that gave you that conclusion, how long 15 have they been in existence? 16 A. The floodplain maps for Harris County, the 17 first floodplain map came out in 1981. 18 Q. And how about the inundation mapping and models 19 you use today? 20 A. The near real-time inundation mapping, we 21 didn't start doing that until 2016. 22 Q. Are you critical of homeowners who don't know 23 that everyone is at risk of flooding in Harris County? 24 A. No. 25 Q. You said -- and I'm going to get this a little</p>	<p style="text-align: right;">257</p> <p>1 A. Observation is more accurate. 2 Q. Why? 3 A. Because you physically go out and see. Models 4 can sometimes not perform the way you think they're 5 going to perform. 6 Q. And not to be disrespectful, but the smartest 7 guys in the world that do HEC-RAS, HEC-RAS 2, HEC-RAS 8 humma humma, that all yields when you've got 9 observation, correct? Observation trumps that every 10 time? 11 A. Yeah. 12 Q. The last question, and I don't mean to be 13 disrespectful to you but I think you gave an unfair 14 answer and I want to -- it's not because of you, but let 15 me get my notes up. I wrote down that without the 16 dams -- Hurricane Harvey without these dams, all that 17 water would have flowed into our properties. I'm a 18 downstream lawyer. You know what "our properties" 19 means. And you said "yes" to Kris. Do you remember 20 that? 21 A. Yes. 22 Q. I think what you meant, I think a fair 23 question -- I think you really meant without the dams 24 that property [sic] would have flowed into downstream 25 property only if Harris County had sat on our thumbs for</p>

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INITIAL EXPERT OPINION REPORT

In Re Downstream Addicks and Barker (Texas) Flood-Control Reservoirs

Prepared for:

Downstream Litigation Leadership Team

On Behalf of:

McGehee, Chang, Landgraf
10370 Richmond Ave, Suite 1300
Houston, TX 77042

Mithoff Law Firm
500 Dallas Street, Suite 3450
Houston, TX 77002

Fleming, Nolen & Jez, LLP
2800 Post Oak Blvd, Suite 4000
Houston, TX 77056

Prepared by:

Matt Bardol, P.E.¹, CFM, D.WRE
Robert Bachus, Ph.D., P.E.², D.GE

Geosyntec 
consultants

engineers | scientists | innovators

1420 Kensington Rd, Suite 103
Oak Brook, IL 60523

¹ Professional Engineer licensed in IL, IN, MO, MI, MS, NE, OH, CA, HI

² Professional Engineer licensed in GA, AR, MS, PA, KY, TN, AL, NC

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Attachment 1: FEMA Flood Insurance Study Flood Profiles and Table 3 (source: FEMA, 2017)

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LIST OF ACRONYMS

1D	one-dimensional
2D	two-dimensional
ac-ft	acre-feet
asl	above sea level
CCR	coal combustion residual
CFM	Certified Floodplain Manager
cfs	cubic feet per second
DEM	digital elevation model
D.GE	Diplomate, Geotechnical Engineering
D.WRE	Diplomate, Water Resources Engineer
EAP	Emergency Action Plan
elev	elevation
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
ft	feet
GOL	government owned land
HCFCDD	Harris County Flood Control District
HEC	Hydrologic Engineering Center
HMS	Hydrologic Modeling System
hr	hour
in.	inch
NAVD	North American Vertical Datum
NED	National Elevation Dataset
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
P.E.	Professional Engineer
RAS	River Analysis System
RoR	rate of rise
RRM	Reservoir Regulation Manual
TNRIS	Texas Natural Resources Information System
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WCM	Water Control Manual
WSE	water surface elevation

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SECTION 1

INTRODUCTION

1.1 Terms of Reference

I, Matthew Bardol, have been retained by the Downstream Litigation Leadership Team which includes the following three attorneys: (i) McGehee, Chang, Landgraf; (ii) Mithoff Law Firm; and (iii) Fleming, Nolen & Jez, LLP; on behalf of the 13 downstream test property plaintiffs, in connection with In Re Downstream Addicks and Barker (Texas) Flood-Control Reservoirs (case 17-CV-9002L). I have been asked to prepare this Initial Expert Opinion Report ("Report") to address opinions related to engineering analyses of damages to the 13 downstream test properties and in the above-referenced lawsuit that relate to inundation downstream of Addicks and Barker dams in Houston, Texas.

Geosyntec is compensated for my services related to this matter at a rate of \$305 per hour for investigation, analysis, and report preparation, deposition and trial preparation, and at a rate of \$610 per hour for deposition and court appearances. Compensation for all work related to this matter is in no way tied to the outcome of this litigation.



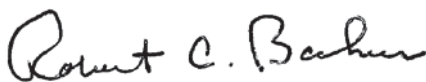
Matt Bardol, P.E., CFM, D.WRE

13 November 2018

Date

I, Robert Bachus, have been retained by the Downstream Litigation Leadership Team which includes the following three attorneys: (i) McGehee, Chang, Landgraf; (ii) Mithoff Law Firm; and (iii) Fleming, Nolen & Jez, LLP; on behalf of the 13 downstream test property plaintiffs, in connection with In Re Downstream Addicks and Barker (Texas) Flood-Control Reservoirs (case 17-CV-9002L). I have been asked to prepare only **SECTION 8** of this Initial Expert Opinion Report ("Report") to address opinions related to the integrity of the Addicks and Barker Reservoirs including but not limited to the spillways.

Geosyntec is compensated for my services related to this matter at a rate of \$305 per hour for investigation, analysis, and report preparation, deposition and trial preparation, and at a rate of \$610 per hour for deposition and court appearances. Compensation for all work related to this matter is in no way tied to the outcome of this litigation.



Bob Bachus, Ph.D., P.E., D.GE

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1.2 Professional Background and Qualifications

Matthew Bardol is a Senior Principal in the Oak Brook office of Geosyntec Consultants (Geosyntec) located at 1420 Kensington Road, Suite 103, Oak Brook, IL 60523, and has been with Geosyntec since June 2010. Geosyntec performs consulting services for civil engineering and water resources projects throughout the United States, as well as internationally in Canada, Asia, Australia, and Europe. As a representative of Geosyntec, Mr. Bardol tenders his preliminary opinion responsive to the Scope of Work stated in **Section 1.3** below.

Mr. Bardol obtained his Bachelor of Science degree in Civil Engineering from University of Notre Dame in 1996. In 1999, he obtained his Masters of Science in Environmental Management from Hardin-Simmons University in Abilene, Texas. In 2002, he obtained his Masters of Science in Civil Engineering, with an emphasis in water resources, from the University of Southern California, in Los Angeles, California.

Mr. Bardol has over 22 years of experience in civil and water resources engineering and hydrologic and hydraulic modeling, including models that predict and quantify flood inundation from storm events. He has been involved with and worked on civil and water resources engineering projects throughout his career, with an emphasis on water resources engineering and modeling projects for the past 17 years.

Mr. Bardol is a Professional Environmental Engineer, and he has been a practicing licensed Professional Engineer (P.E.) in the State of California since 2001 and has received reciprocity in multiple states across the U.S. Further details outlining Mr. Bardol's work experience and qualifications to serve as an expert are described in his background information, which is attached to this Report as **Appendix A**.

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Robert Bachus is a Senior Principal in the Kennesaw office of Geosyntec Consultants (Geosyntec) located at 1255 Roberts Blvd., Suite 200, Kennesaw, GA 30144, and has been with Geosyntec since September 1990. As a representative of Geosyntec, Dr. Bachus tenders his preliminary opinion responsive to the Scope of Work stated in **Section 1.3** below.

Dr. Bachus obtained his Bachelor of Science and Masters of Science degrees in Civil Engineering from University of Illinois Chicago Circle in 1974 and 1975, respectively. In 1982, he obtained his Doctor of Philosophy in Geotechnical Engineering from Stanford University.

Dr. Bachus has over 35 years of experience in geotechnical and geoenvironmental engineering, including geotechnical site characterization, settlement and slope stability analysis, and performance monitoring of geotechnical features and earth structures. He previously served as a geotechnical engineering faculty at Georgia Institute of Technology and focused his research on the beneficial re-use of coal combustion residuals (CCRs) and engineering applications for geosynthetic materials, primarily on reinforcing and drainage produce development.

Dr. Bachus is a Professional Engineer, and he has been a practicing licensed Professional Engineer (P.E.) in the State of Georgia since 2003 and has received reciprocity in multiple states across the U.S. Further details outlining Dr. Bachus's work experience and qualifications to serve as an expert are described in his background information, which is attached to this Report as **Appendix A**.

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1.3 Scope of Work

Geosyntec has been asked to review documents and data cited in **Section 1.4** below to assess whether and to what extent the induced surcharge procedures initiated by the U.S. Army Corps of Engineers (USACE) caused inundation of and associated damage to 13 downstream test properties and whether such inundation and associated damage would have been avoided or reduced without the induced surcharge. We have also been asked to offer preliminary analysis of certain defense arguments that may be raised in this litigation. To that extent, we reserve the right to amend our report and/or add opinions and conclusions based on future evidence.

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1.4 Scope and Bases of Opinions

Geosyntec was asked to conduct an evaluation of the hydrologic and hydraulic impacts of Hurricane Harvey in conjunction with the operation of the Addicks and Barker Reservoirs on behalf of the Downstream Litigation Leadership Team. We reviewed the following data and documents in preparation for this Report, and these data and documents serve as the bases of our opinions. We reviewed a two-dimensional (2D) model developed by the USACE using the USACE Hydrologic Engineering Center (HEC) River Analysis System (RAS) software version 5.0.5 (HEC-RAS). We also reviewed the one-dimensional (1D) HEC-RAS model developed by the Harris County Flood Control District (HCFCD) which is the basis of the regulatory Federal Emergency Management Agency (FEMA) effective floodplain models for Harris County. Furthermore, we reviewed Dr. Phil Bedient's (Herman Brown Professor of Engineering at Rice University) modifications to the HCFCD 1D HEC-RAS model. We reviewed hydrology models including the HCFCD regulatory model based on the USACE Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS), as well as Dr. Bedient's HEC-HMS model simulating flows during Hurricane Harvey. We also reviewed additional data and testimony as indicated below.

- USACE 2D HEC-RAS model (provided as modeling files during discovery labeled with Bates number USACE189773)
- HCFCD 1-D HEC-RAS model (HCFCD, 2018a)
- Dr. Bedient's 1D HEC-RAS model (Bedient, 2018)
- HCFCD HEC-HMS model (HCFCD, 2018a)
- 1962 Reservoir Regulation Manual (RRM) for Addicks and Barker Reservoirs Initial and Emergency Instructions to Dam Tender (USACE, 1962)
- 2012 Water Control Manual (WCM) for Addicks and Barker Reservoirs, Buffalo Bayou and Tributaries, San Jacinto River Basin, TX (USACE, 2012)
- 2014 Emergency Action Plan (EAP) for Addicks and Barker Reservoirs, Buffalo Bayou and Tributaries (USACE, 2014)
- USACE "Hurricane Harvey Flood Inundation Mapping After Action Report" (USACE, 2018)
- USACE spreadsheet of pool level, gate outflow rates, rate of rise (RoR), and calculated inflow rates typically referred to as the "morning report" according to Kauffman deposition (provided as spreadsheet during discovery labeled with Bates number USACE006034)
- U.S. Geological Survey (USGS) stream flow and water surface elevation (WSE) gauge data (USGS, 2018) at the following locations:
 - 08072500 Barker Res nr Addicks, TX
 - 08072600 Buffalo Bayou at State Hwy 6 nr Addicks, TX
 - 08073000 Addicks Res nr Addicks, TX

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- 08073100 Langham Ck at Addicks Res Outflow nr Addicks, TX
 - 08073500 Buffalo Bayou nr Addicks, TX
 - 08073600 Buffalo Bayou at W Belt Dr, Houston, TX
 - 08073700 Buffalo Bayou at Piney Point, TX
 - 08074000 Buffalo Bayou at Houston, TX
- Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for Harris County, Texas (FEMA, 2017)
- Downstream plaintiff testimony including the following plaintiffs:
 - Arnold Milton testimony on 10 July 2018 (Milton, 2018a)
 - Virginia Milton testimony on 10 July 2018 (Milton, 2018b)
 - Jennifer Shipos testimony on 19 September 2018 (Shipos, 2018)
 - John Britton, for SMC Memorial Investment 2013 LP, testimony on 16 July 2018 (Britton, 2018)
 - Jeremy Good, for Good Resources LLC, testimony on 19 July 2018 (Good, 2018)
 - Val Aldred testimony on 1 August 2018 (Aldred, 2018)
 - Peggy Hollis testimony on 19 July 2018 (Hollis, 2018a)
 - Wayne Hollis testimony on 19 July 2018 (Hollis, 2018b)
 - Peter Silverman testimony on 18 July 2018 (Silverman, 2018a)
 - Zhennia Silverman testimony on 18 July 2018 (Silverman, 2018b)
 - Arnstein Godejord testimony on 17 September 2018 (Godejord, 2018a)
 - Igna Godejord testimony on 17 September 2018 (Godejord, 2018b)
 - Dana Cutts testimony on 27 June 2018 (Cutts, 2018a)
 - Paul Cutts testimony on 27 June 2018 (Cutts, 2018b)
 - Gokhan Beyoglu testimony on 18 September 2018 (Beyoglu, 2018b)
 - Jana Beyoglu testimony on 18 September 2018 (Beyoglu, 2018a)
 - Phillip Azar testimony on 9 July 2018 (Azar, 2018)
 - Tim Stahl testimony on 5 September 2018 (Stahl, 2018)
 - Shawn Welling testimony on 14 August 2018 (Welling, 2018)
 - Dutch Lindeburg testimony on 26 September 2018 (Lindeburg, 2018)
- USACE witness testimony including the following witnesses:
 - Michael Kauffman expert testimony on 25 September 2018 (Kauffman, 2018)
 - Robert Thomas expert testimony on 31 July 2018, 3 August 2018, and 7 September 2018 (Thomas, 2018)
 - Jeff Lindner expert testimony on 24 September 2018 (Lindner, 2018)
 - Jamila Johnson expert testimony on 19 October 2018 (Johnson, 2018)

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- Braxton Coles expert testimony on 19 October 2018 (Coles, 2018)
- Texas Natural Resources Information System (TNRIS) elevation data (TNRIS, 2018)
- HCFCFCD precipitation data sources (HCFCFCD, 2018b)
- High water marks (provided as spreadsheet during discovery labeled with Bates number FEMA004231, summary tables labeled with Bates numbers USACE150516 and USGS0000032, and shapefile labeled with Bates number FEMA004230)

The list of documents considered and the modeling files referenced above can be found in **SECTION 10** at the end of this Report.

Given the limited time period for submission of this Report under the Court's schedule, we have not undertaken an effort to address all of the points and issues associated with this case, and we may revise or supplement the information in this Report as we continue to review the testimony of technical experts and eyewitnesses, the digital model files provided, and the Expert Reports submitted to the court.

We also reserve the right to examine additional information as it becomes available, including through further discovery in this case, and to add to or modify our opinions based on such additional information.

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1.5 Report Organization

This Report is organized as follows:

- **SECTION 1** describes the terms, background, mission, and scope of this Report;
- **SECTION 2** presents an introduction and factual background to the case;
- **SECTION 3** presents the 13 downstream test properties considered in this Report;
- **SECTION 4** presents a review of the data sources relied upon and a general timeline of events during Hurricane Harvey;
- **SECTION 5** provides an overview of the hydraulic modeling methodology used in developing opinions related to inundation of the 13 downstream test properties;
- **SECTION 6** provides an overview of the hydraulic modeling results discussed in the methodology section related to inundation of the 13 downstream test properties;
- **SECTION 7** presents opinions related to inundation of the 13 downstream test properties as a result of the engineering analyses conducted;
- **SECTION 8** presents opinions related to the integrity of the Addicks and Barker Reservoirs including but not limited to the spillways;
- **SECTION 9** provides preliminary opinions on the defense arguments that have been raised or potentially may be raised later; and
- **SECTION 10** presents a detailed list of references.

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SECTION 2

INTRODUCTION AND FACTUAL BACKGROUND

2.1 History and Purpose of the Reservoirs

Addicks Dam, as presently constructed, includes an earthen dam approximately 61,000 feet (ft) long, with the top of the dam at elevation 121.0 ft³ (USACE, 2012 at Sec. 2-03a). The ends of the embankment terminate at a natural ground elevation of 108.0 ft on the north end and 112.0 ft on the west end (USACE, 2012 at Sec. 2-03a). Two auxiliary spillways, located at the north and west ends of the dam embankment, were reinforced with roller-compacted concrete by September 1988 (USACE, 2012 at Sec. 2-03a; Table 3-01).

Barker Dam, as presently constructed, includes an earthen dam approximately 72,000 ft long, with the top of the dam at an elevation of 113.1 ft (USACE, 2012 at Sec. 2-03c). The ends of the embankment terminate at a natural ground elevation of 104.0 ft (USACE, 2012 at Sec. 2-03c). Two auxiliary spillways, located at the northwest and southwest ends of the dam embankment, were reinforced with roller-compacted concrete by September 1988 (USACE, 2012 at Sec. 2-03c; Table 3-01).

The USACE describes the purpose of the Addicks and Barker Reservoirs as including “flood risk management protection provided to the City of Houston from flood damages... The two reservoirs provide floodwater detention for flood risk management on the Buffalo Bayou watershed...” (USACE, 2012 at Sec. 2-02). As initially designed, the outlets of each reservoir consisted of five box culvert conduits, with one conduit gated and the other four uncontrolled (USACE, 2012 at Sec. 3-02). By February 1963, all of the conduits on both reservoir outlets had been gated (USACE, 2012 at Table 3-01). According to the USACE, “the gating of the last two uncontrolled conduits on both projects in 1963 made it possible to reduce downstream flooding...” (USACE, 2012 at Sec 3-05).

2.2 USACE Considerations in Operating the Reservoirs

An October 2009 “Draft Operational Assessment of the Addicks and Barker Reservoirs” (USACE, 2009; USACE464017), confirms that “[t]he sole authorized purpose for Addicks and Barker Reservoirs is to reduce potential flood damage along the downstream reach of Buffalo Bayou” (USACE, 2009 at USACE464026). The 2009 “Draft Operational Assessment” further evaluates “operational constraints” for the reservoirs, as they relate to both downstream and upstream flooding risk (USACE, 2009 at USACE464039, emphasis added):

³ Unless otherwise specified, all elevations herein are specified in feet, NAVD 1988 (North American Vertical Datum 1988, Epoch 2001).

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The increase in downstream development (and possibly downstream tributary inflow) has contributed to reductions in allowable outflows. ***The dams are operated strictly to prevent downstream flooding; therefore, the gates remain shut even if pool levels increase and flood upstream properties.*** The flood pools have never exceeded the limit of GOL [government owned land] and the homes upstream of the dams have not flooded due to the pool. However, available hydrologic models indicate that the limit of GOL would be exceeded in extreme events; for example, it is believed that if Tropical Storms Allison or Claudette had been centered on the basin, flooding of the upstream development would have occurred.

That same document generally describes the USACE's operational procedures for the reservoirs, and considerations taken into account by the USACE with respect to those procedures (USACE, 2009 at USACE46049, emphasis added):

The current procedure is to prevent downstream flooding and protect downstream properties. During a flooding event, the gates are closed and the reservoir levels are allowed to rise until they overflow the spillways. Since there is development adjacent to the GOL, these structures would be flooded during an extreme event. As noted earlier, there is significant development within the fringe area between the GOL and the maximum pool elevation. ***With such high valuation of upstream properties, it might be desirable to increase the allowable release rates from the reservoir once the downstream peak flows have occurred, and accept some increased duration of downstream flooding.***

2.3 The Purpose of Induced Surcharge Operations

Robert Thomas, the USACE's designated witness to testify regarding "[p]olicies for releases of water from the reservoirs from 2012 through the present..." testified regarding the USACE's release of water (also referred to as "induced surcharge") from the reservoirs during and after Hurricane Harvey. He testified that during Hurricane Harvey, the USACE "started surcharge regulations according to the schedules" in the USACE's 2012 WCM for the reservoirs (Thomas Depo. Vol. I at 140). Operating the reservoirs pursuant to the "induced surcharge flood control regulation" in the 2012 WCM has the effect of opening the reservoir flood control gates and inundating downstream properties (USACE, 2012 at USACE016339). These operation procedures differ from the 2012 WCM's "Normal Flood Control Regulation," which keeps the gates closed during flood events, until releases can be made in a manner that does not cause damaging downstream flooding (USACE, 2012 at USACE016338).

The USACE's 2012 WCM specifies pool level trigger points (coupled with rate of rise thresholds) for commencing induced surcharge operations. For Addicks Reservoir, the pool level trigger point for commencing induced surcharge releases from the reservoir is 101.0 ft. For Addicks Reservoir, the limits of GOL are reached at a pool level of 103.0 ft (Ex. 68 to Thomas Depo. at Table A1).

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Water Elevation Impact Tables published by the USACE in the 2014 Emergency Action Plan (“2014 EAP”) reflect the “first street flooded upstream” for Addicks Reservoir occurs at an elevation of 101.2 ft, and the “first home inundated upstream” for Addicks occurs at an elevation of 103.4 ft (USACE, 2014 at E-2). For Barker Reservoir, the pool level trigger point for commencing induced surcharge releases from the reservoir is 95.7 ft. For Barker, the limits of GOL are reached at a pool level of 95.0 ft (Ex. 68 to Thomas Depo. at Table A2). The 2014 EAP reflects that, for Barker Reservoir, “first street flooded upstream” occurs at an elevation of 94.9 ft, and “first home inundated upstream” occurs at an elevation of 97.1 ft (USACE, 2014 at E-4).

Robert Thomas testified regarding the purpose of making induced surcharge releases (Thomas Depo. Vol. I at 136-138):

- Q. And what are induced surcharge releases?
- A. Generally, that refers to releases within the induced surcharge regulation schedule.
- Q. What is the purpose of making induced surcharge releases?
- A. The purpose of making induced surcharge releases is to, as it says above, utilize the maximum extent possible for the reservoirs.
- * * *
- Q. [I]t’s maximize storage and then prevent water from going around the ends of the dams. Is that what you said?
- A. Right. And in general, to prevent a damaging condition to the dams.

The USACE’s action in commencing induced surcharge operations burdened the downstream test property owners with flooding, by discharging water downstream that, under normal flood control regulation procedures would have protected the downstream test properties by being retained upstream, diverted over the auxiliary spillways to other areas, or released downstream at a later date in a non-damaging manner.

2.4 The Cause of Inundation During Harvey – USACE’s Release of Waters from the Addicks and Barker Reservoirs Pursuant to its Water Control Manual

When the USACE opened the flood control gates for the Addicks and Barker Reservoirs, it did so pursuant to its 2012 WCM for the reservoirs, and released substantial additional water into Buffalo Bayou. The hydraulic modeling, testimony, and other evidence analyzed throughout this Report show that, had the Addicks and Barker gates remained closed, the downstream test properties would not have been inundated (other than the small number of test properties that experienced minimal flooding prior to the gates opening). The opening of the gates by the USACE was thus the cause of inundation and/or worsened and prolonged inundation experienced by the downstream test property owners.

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2.5 USACE Knew in Advance of Opening of the Flood Control Gates the Full Extent of the Damaging Inundation of Downstream Test Properties that Would Occur

Considering the amount of water released according to the induced surcharge schedules in the 2012 WCM, the USACE knew in advance of opening the flood control gates the scope and extent of anticipated downstream inundation. A 2016 “Memorandum for Record,” prepared after the Tax Day Flood and before Hurricane Harvey, indicates that the USACE was aware of what land areas flood first downstream, and at what flow release rates (Ex. 68 to Thomas Depo. at USACE02034):

Determinations of potential flood damages were assessed using USACE surveys of 1st floor structure elevations and Buffalo Bayou reconnaissance of requested releases after the Memorial Day Flood of 2015 and the Tax Day Flood of 2016. Using USACE surveys of 1st floor elevation data, it was determined that the lower level of homes in the vicinity of the West Beltway Bridge (approximately 6.5 miles downstream of the reservoirs) experience flooding at discharges in Buffalo Bayou of 4,100 cfs. This data is consistent with complaints of property inundation typically received by the District at discharges of 3,000 cfs and above. At flows greater than 4,100 cfs, a large percentage of the structures incurring flood damage are located between the bridges over Buffalo Bayou at North Wilcrest Drive (approximately 5 miles downstream of the reservoirs, measured along the streambed) and Chimney Rock Road (approximately 16 miles downstream of the reservoirs).

Both the 2012 WCM and 2014 EAP also contain constant flow area maps, which model downstream Buffalo Bayou inundation at various flow rate assumptions, up to 20,000 cfs (well in excess of the maximum combined release rates from Addicks and Barker Reservoirs during Hurricane Harvey). **Figure 2-1** shown below provides an example of the “Buffalo Bayou Constant Flow Area Map” inundation modeling information available to the USACE prior to Hurricane Harvey.

Mr. Thomas testified that, at the time of Hurricane Harvey, the USACE had the capability to evaluate and to know in advance of opening the flood control gates the full extent of downstream inundation that would occur by street, intersection, and block, within the accuracy of the model itself (Thomas Depo. Vol. III at 547, 556):

- Q. Was the Corps able to ascertain from this modeling what the water surface elevation was at each of those CFS levels?
- A. So the RAS model does estimate elevation and discharge, sir.
- Q. And that was knowledge that the Corps had at the time this was created, this manual and this model was created?
- A. Yes, sir.

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Q. And knowledge that the Corps had at the time of Harvey?

A. Yes, sir.

* * *

Q. Well, you can tell me that the Corps has the capability of zooming in on a model such as 5A?

A. Yes, sir.

Q. You have that technical capability?

A. Yes, sir.

Q. And had it at the time of Harvey?

A. Yes, sir.

Q. So the Corps had the capability to zoom in on a constant flow map or an inundation map, did it not?

A. Yes, sir.

Q. And had that capability at the time of Harvey?

A. Yes, sir.

Q. And the Corps could by zooming in on either this constant flow map or the inundation maps being run pre-Harvey or during the time of Harvey actually identify streets and intersections and blocks on the inundation map?

A. Right. Within the accuracy of the model, sir.

After Hurricane Harvey, the USACE undertook an effort to calculate the percentage of flow in downstream Buffalo Bayou attributable to the reservoir releases (Ex. 73 to Thomas Depo). At times, after the induced surcharge releases began, USACE calculated that up to 100% of flow in Buffalo Bayou was attributable to reservoir releases (Ex. 73 to Thomas Depo).

In addition to the constant flow area maps presented in the 2012 WCM and 2014 EAP, the USACE would have readily had access to the recently prepared Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) dated 6 January 2017 (FEMA, 2017). Detailed Flood Profiles are presented in Volume 8 of the FIS, which include the full length of Buffalo Bayou. These exhibits (included as **Attachment 1** to this Report) present the water surface elevations along the full length of Buffalo Bayou for a range of flows. Table 3 in Volume 1 of the FIS presents peak discharges associated with the 10-, 50-, 100-, and 500-year storm events at six locations along Buffalo Bayou (also included in **Attachment 1** to this Report). Each of these flows are directly associated with the various water surface elevations presented on the exhibits included as **Attachment 1**.

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2.6 There Was No Emergency – The Reservoirs Performed as Expected by USACE

A 27 October 2017 USACE “Memorandum for Commander” states that the reservoirs performed as expected during Hurricane Harvey (Ex. 25 to Thomas Depo. at USACE016689, emphasis added):

The embankment, outlet structures, and emergency spillways functioned as intended. Piezometers, settlement pins, and alignment surveys for the outlet structures do not shown [sic] any alarming trends from this pool of record. There were no observations of seepage, or critical distress areas located on the dams. Wet areas located on the downstream embankment toe were monitored, but showed no signs of flow... *Overall conclusion is that the project was performing as expected with no significant problems during this pool of record event.*

Mr. Thomas testified regarding the purpose of the Memorandum (Thomas Depo. Vol. II at 265):

- Q. What is the purpose of this Memorandum for Commander that has been marked as Exhibit 25? Why was it prepared?
- A. After every flood of record, we prepare a document documenting the state of the dams immediately afterward.
- Q. Is one of the purposes of preparing this memorandum to assess whether or not the Addicks and Barker dams and reservoirs performed as expected during that new pool of record?
- A. Yes, sir.

A “Report of Performance” enclosed with the Memorandum reflects that “the Addicks and Barker dams’ watersheds received between 32-35 inches of rain during a 4-day period, August 25, 2017 through August 29, 2017...” (Ex. 25 to Thomas Depo. at USACE016691). Accordingly, the Memorandum’s finding concerning dam performance during Hurricane Harvey is consistent with the design criteria for the reservoirs, as the “spillway design flood” for the reservoirs is “computed as 44.6 inches in 72 hours, with a peak intensity of 11.3 inches” (USACE, 2012 at Sec. 8-02a).

The Memorandum’s findings are also consistent with the fact that no formal declaration of Level 1, Level 2, or Level 3 “Emergency” was made during Hurricane Harvey, as defined in the 2014 EAP for the reservoirs (USACE, 2014 at 15-16). A Level 1 emergency (the lowest level in the EAP) is defined as “a developing condition in which the dam has not failed but possibly could if the situation continues to develop” (USACE, 2014 at 15). In fact, Mr. Thomas testified that he was not aware of any Level 1, 2, or 3 emergency ever having been formally declared in the history of the dams (Thomas Depo. Vol. II at 275):

- Q Has there ever been a formal declaration of a Level 2 emergency in the history of the Addicks and Barker dams and reservoirs?

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- A. Not that I know of, sir.
- Q. Has there ever been a formal declaration of Level 1 emergency?
- A. Not that I know of, sir.
- Q. Has there ever been a formal declaration of Level 3 emergency?
- A. Not that I know of, sir.

Per USACE's own post-Harvey report, there is no credible evidence that any emergency implicating possible dam failure existed at the time of Hurricane Harvey.

2.7 Summary of Conclusions

During and after Hurricane Harvey, Addicks and Barker Reservoirs were operated in a manner that caused downstream flooding as a result of induced surcharge operations. Induced surcharge operations had the effect of mitigating upstream inundation, to the detriment of downstream properties, which experienced inundation that otherwise would not have occurred. At the time of Hurricane Harvey, USACE knew – with specificity to streets, blocks, or intersections – the downstream impact of its decision to release water from Addicks and Barker Reservoirs pursuant to the 2012 WCM's induced surcharge procedures. As explained in this Report, action undertaken by USACE to open the Addicks and Barker gates was the decision that caused the downstream test properties to be inundated, and those properties would not have been inundated, and/or would not have been inundated to the extent experienced during and after Hurricane Harvey, but for the induced surcharge release⁴. This decision to abandon from the long-standing policy of protecting downstream properties increased the duration and depth of inundation.

⁴ No conclusions can be reached to a reasonable degree of scientific and engineering probability with respect to downstream test property #12 Stahl



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SECTION 3

TEST PROPERTIES

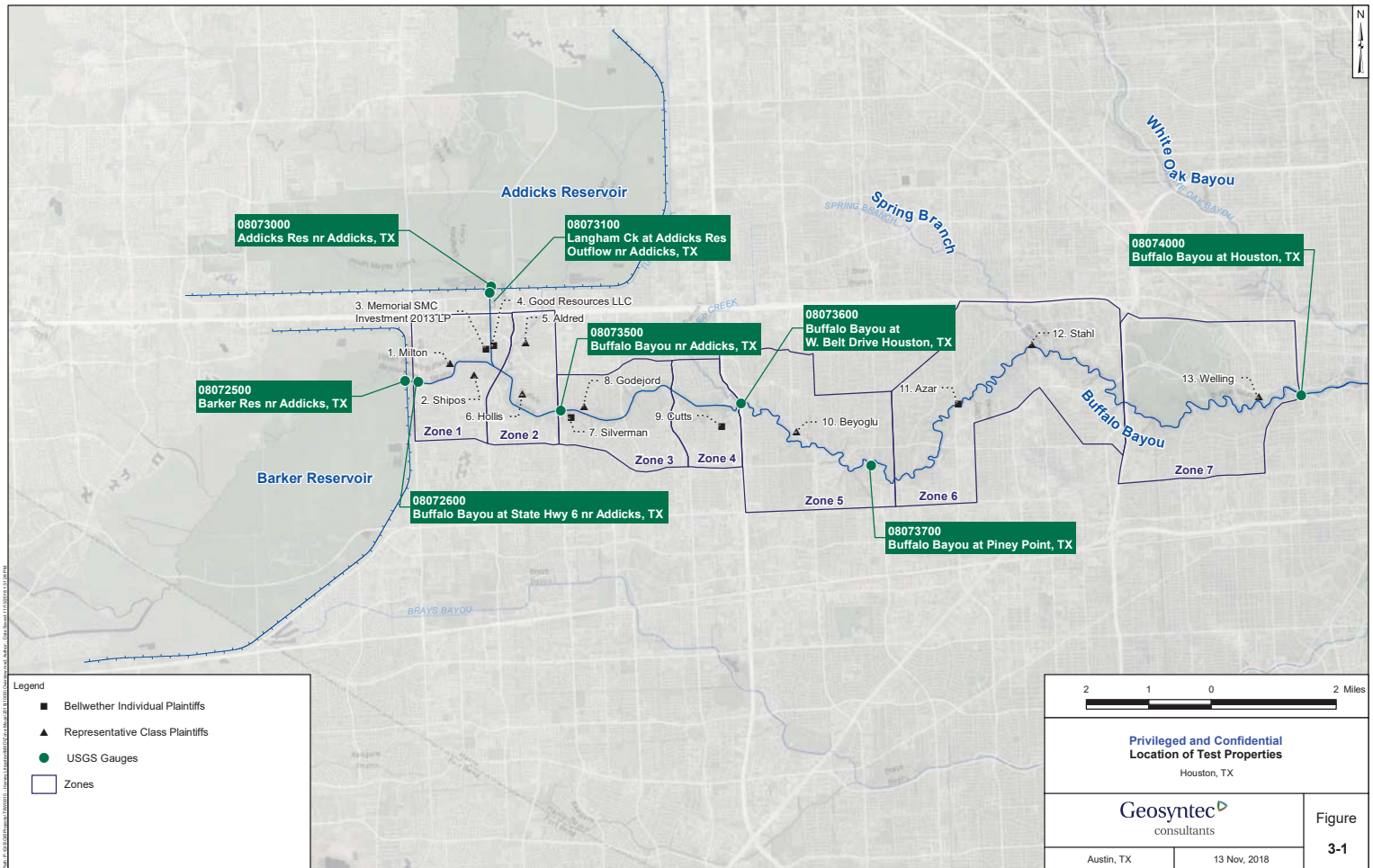
The list of plaintiffs considered in this Report are based on the “Order Regarding Test Property Selection” Document 81, filed 28 March 2018. The only amendment to the list of plaintiffs identified in Document 81 is the removal of the Becky Ho property at 419 West Sam Houston Parkway North. The remaining 13 downstream test properties which were investigated for this Report are summarized in **Table 3-1** below. The “Zone” identification is based on the “Consolidated and Amended Downstream Master Complaint” Document 23, filed 16 January 2018. The only amendments to the zones identified is that the Good Resources LLC property and the Phillip Azar property were not originally identified in the “Consolidated and Amended Downstream Master Complaint.” These 13 downstream test properties, together with the zone designations are shown in **Figure 3-1** (together with associated sub-figures).

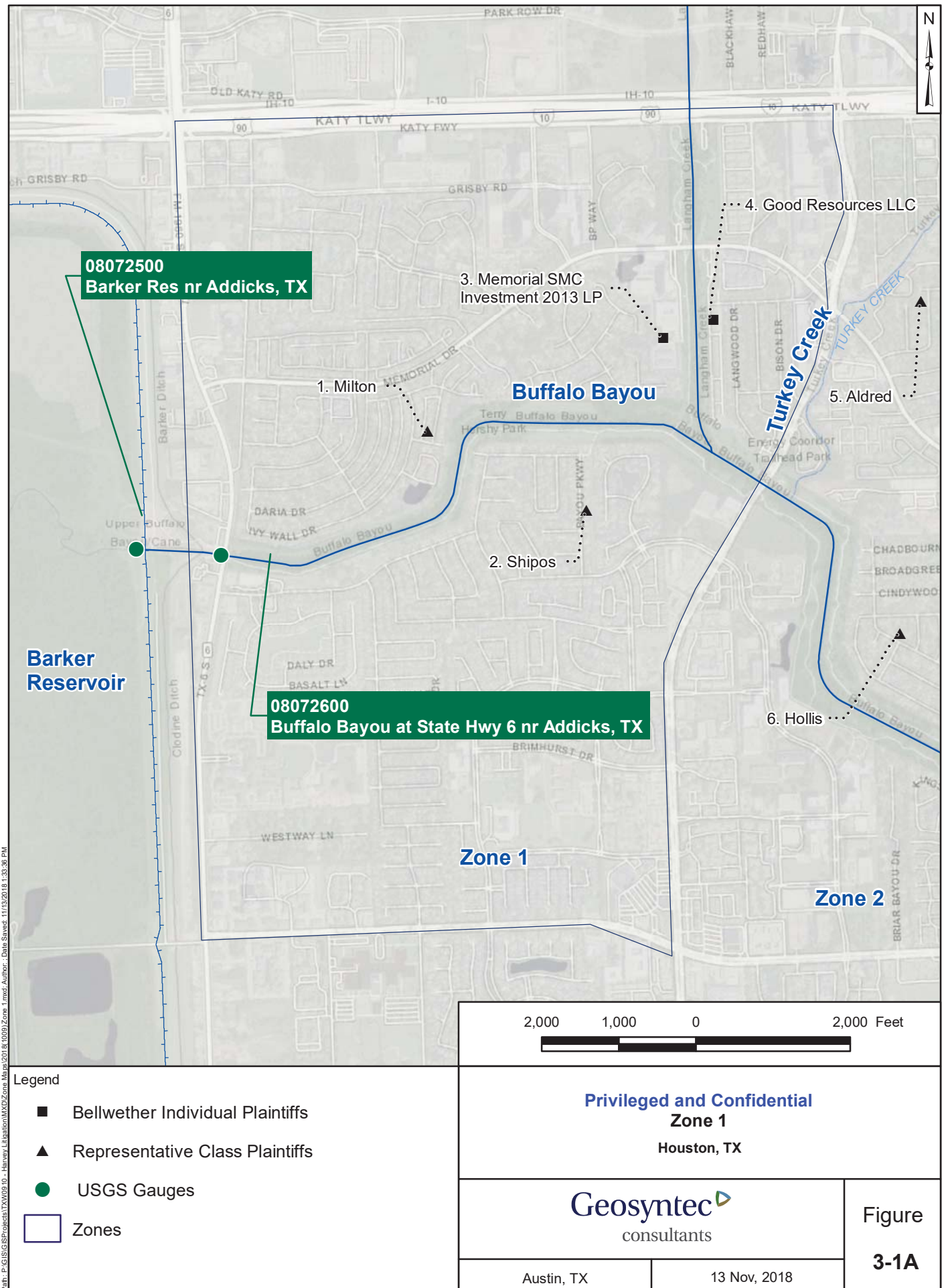
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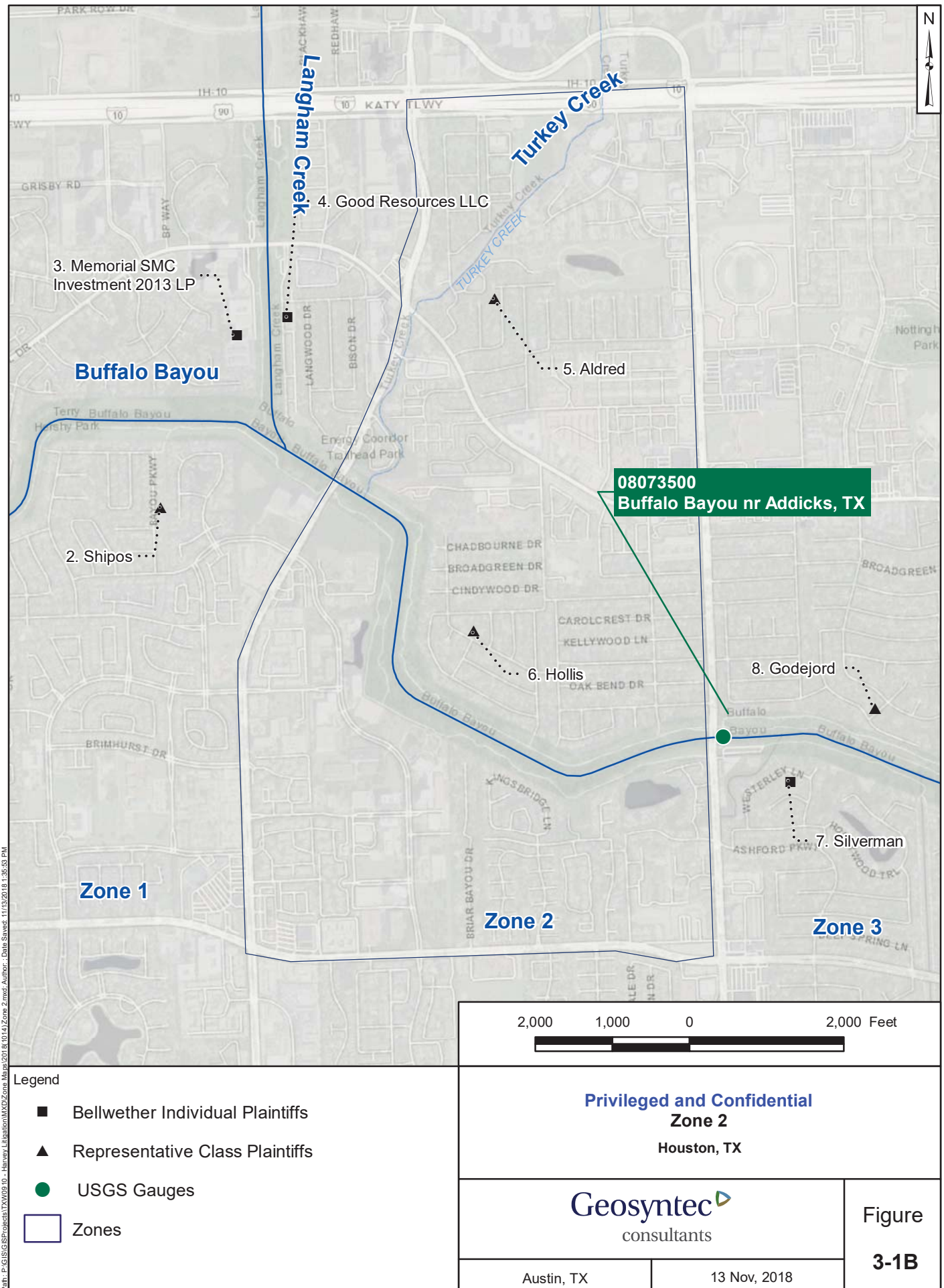
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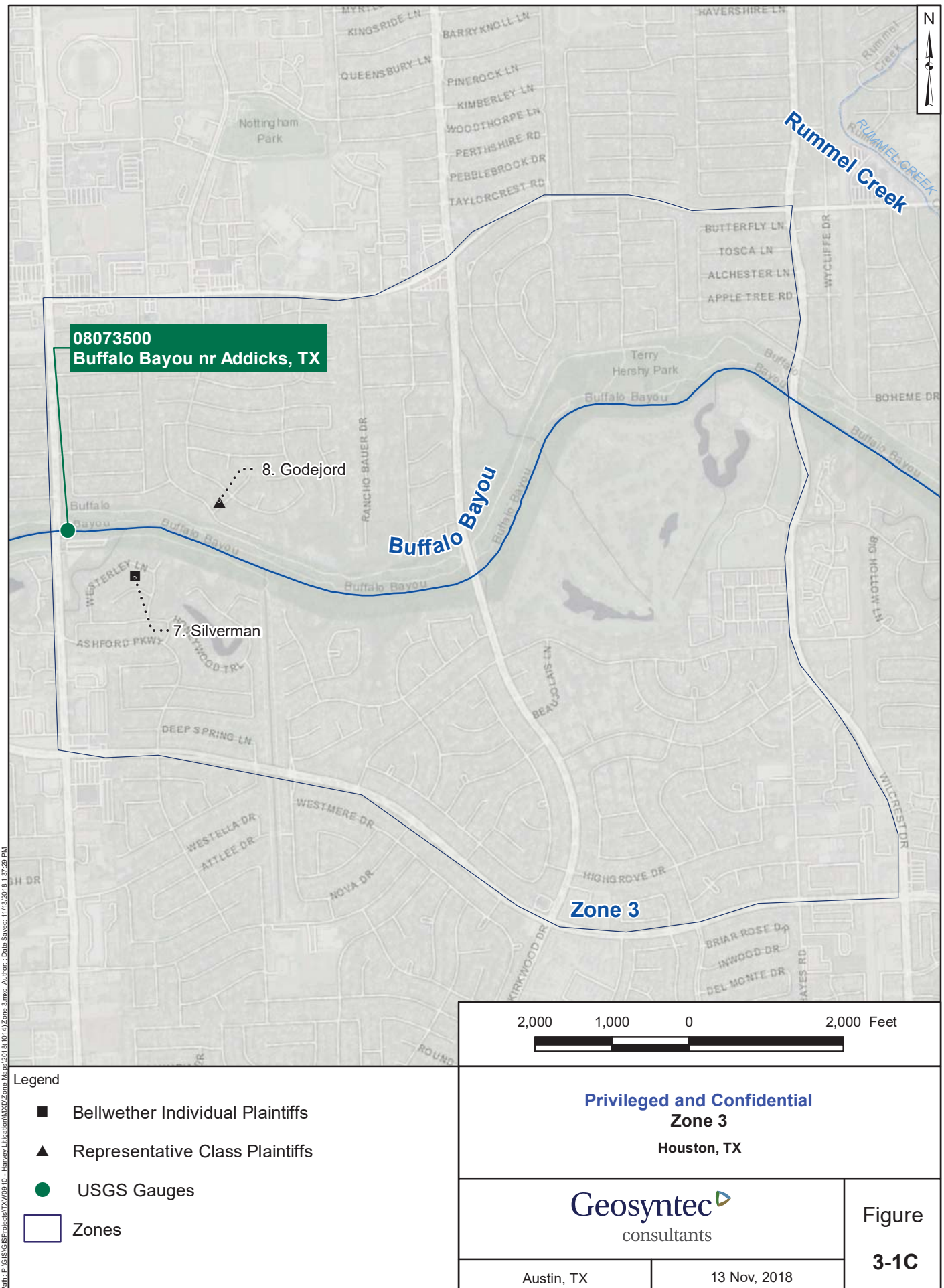
Table 3-1: List of Test Properties

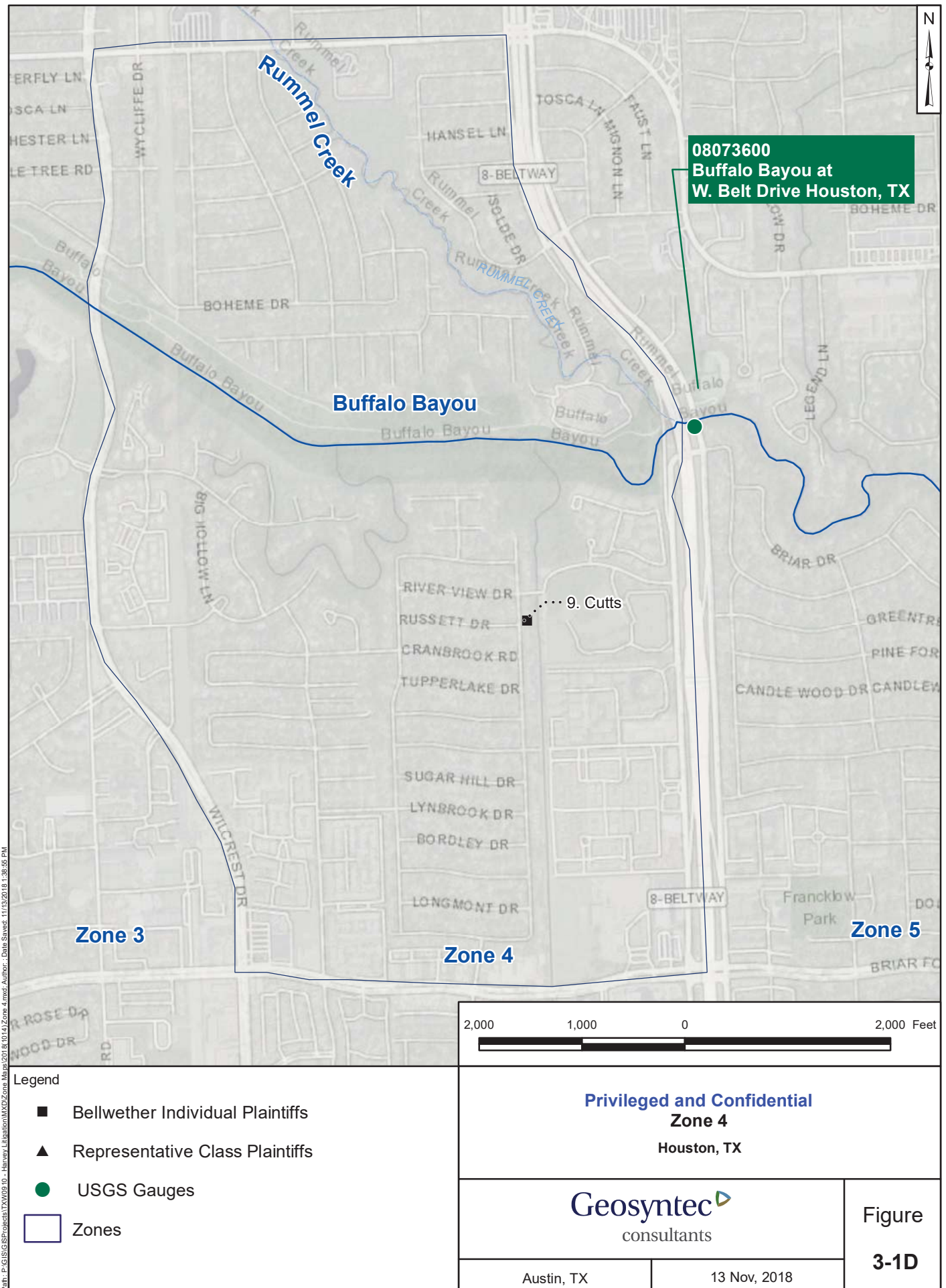
Number	Plaintiff Name	Plaintiff Type	Address	Zone
1	Milton, Virginia and Arnold	Representative Class Plaintiff	850 Silvergate Drive	1-North
2	Shipos, Jennifer	Representative Class Plaintiff	931 Bayou Pkwy	1-South
3	Memorial SMC Investment 2013 LP	Bellwether Individual Plaintiff	777 S Mayde Creek Drive	1-North
4	Good Resources LLC	Bellwether Individual Plaintiff	760 Memorial Mews St. #4	1-North
5	Aldred, Val	Representative Class Plaintiff	835 Thornvine Lane	2-North
6	Hollis, Wayne and Peggy	Representative Class Plaintiff	14914 River Forest Drive	2-North
7	Silverman, Peter and Zhennia	Bellwether Individual Plaintiff	12515 Westerley Lane	3-South
8	Godejord, Arnstein and Igna	Representative Class Plaintiff	14334 Heatherfield Drive	3-North
9	Cutts, Paul and Dana	Bellwether Individual Plaintiff	311 Blue Willow Drive	4-South
10	Beyoglu, Jana and Gokhan	Representative Class Plaintiff	107 Warrenton Drive	5-North
11	Azar, Phillip	Bellwether Individual Plaintiff	3 Magnolia Bend Drive	6-North
12	Stahl, Tim	Representative Class Plaintiff	265 Chimney Rock Road	6-North
13	Welling, Shawn	Representative Class Plaintiff	5731 Logan Lane	7-North

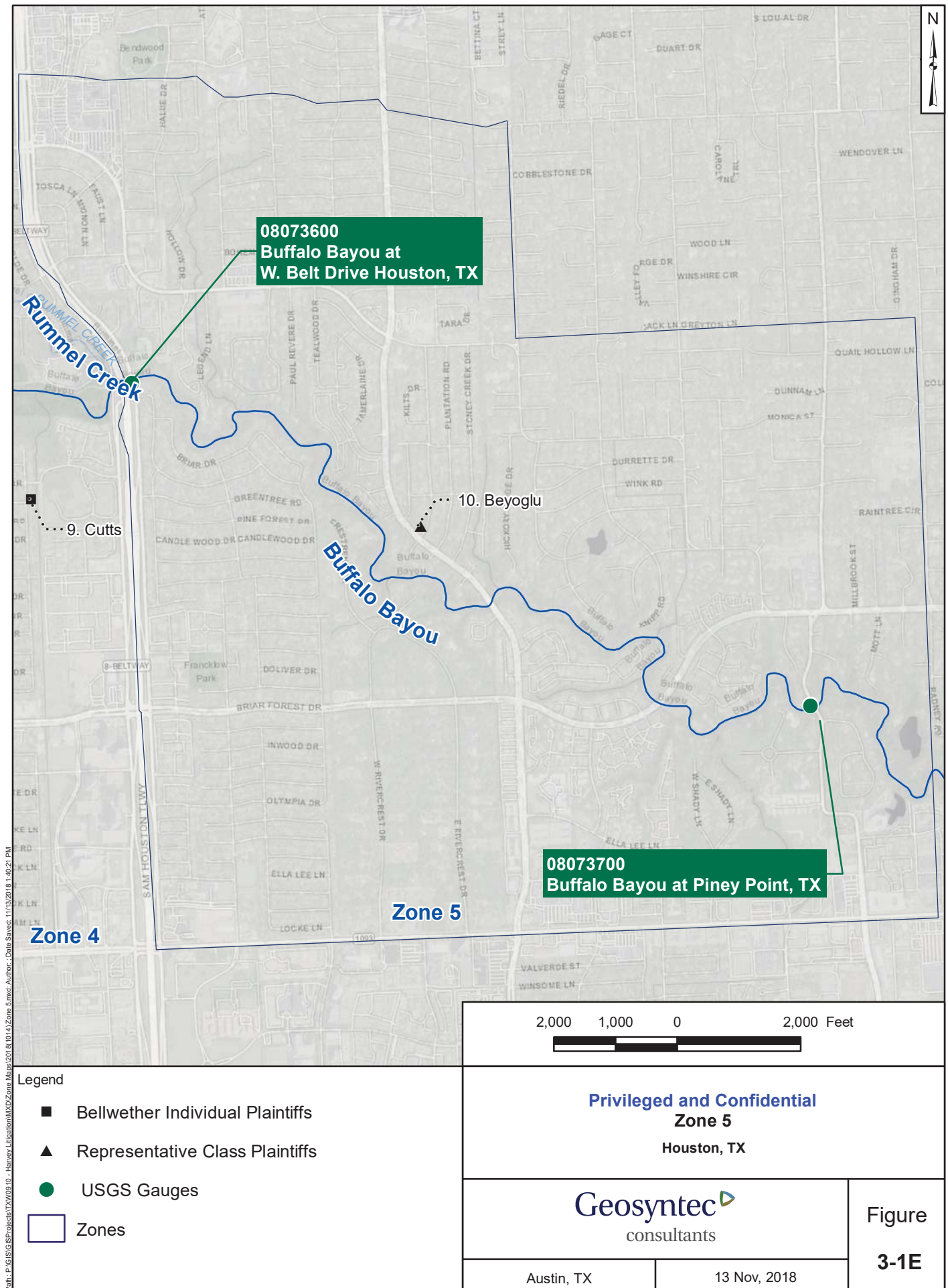


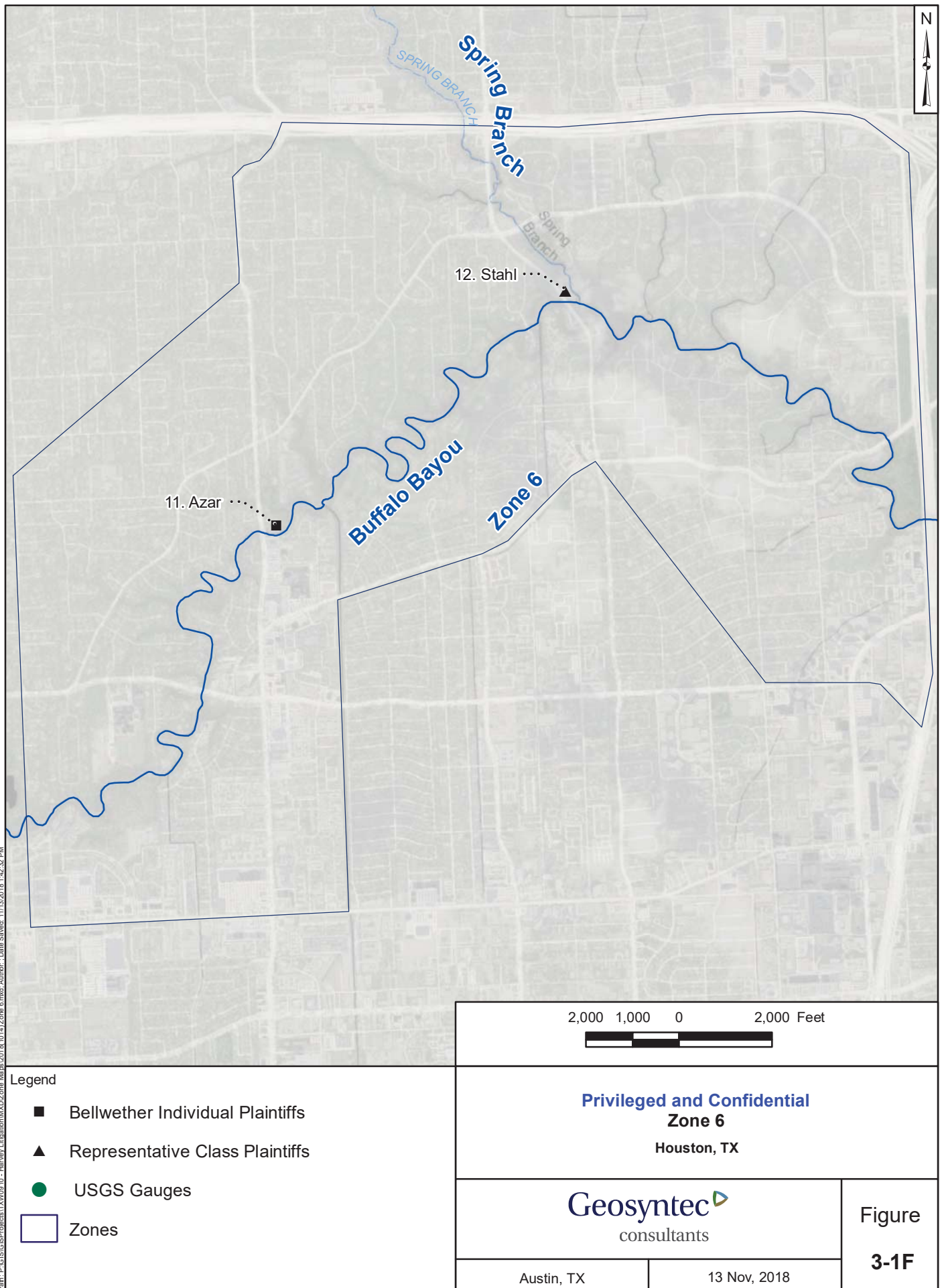


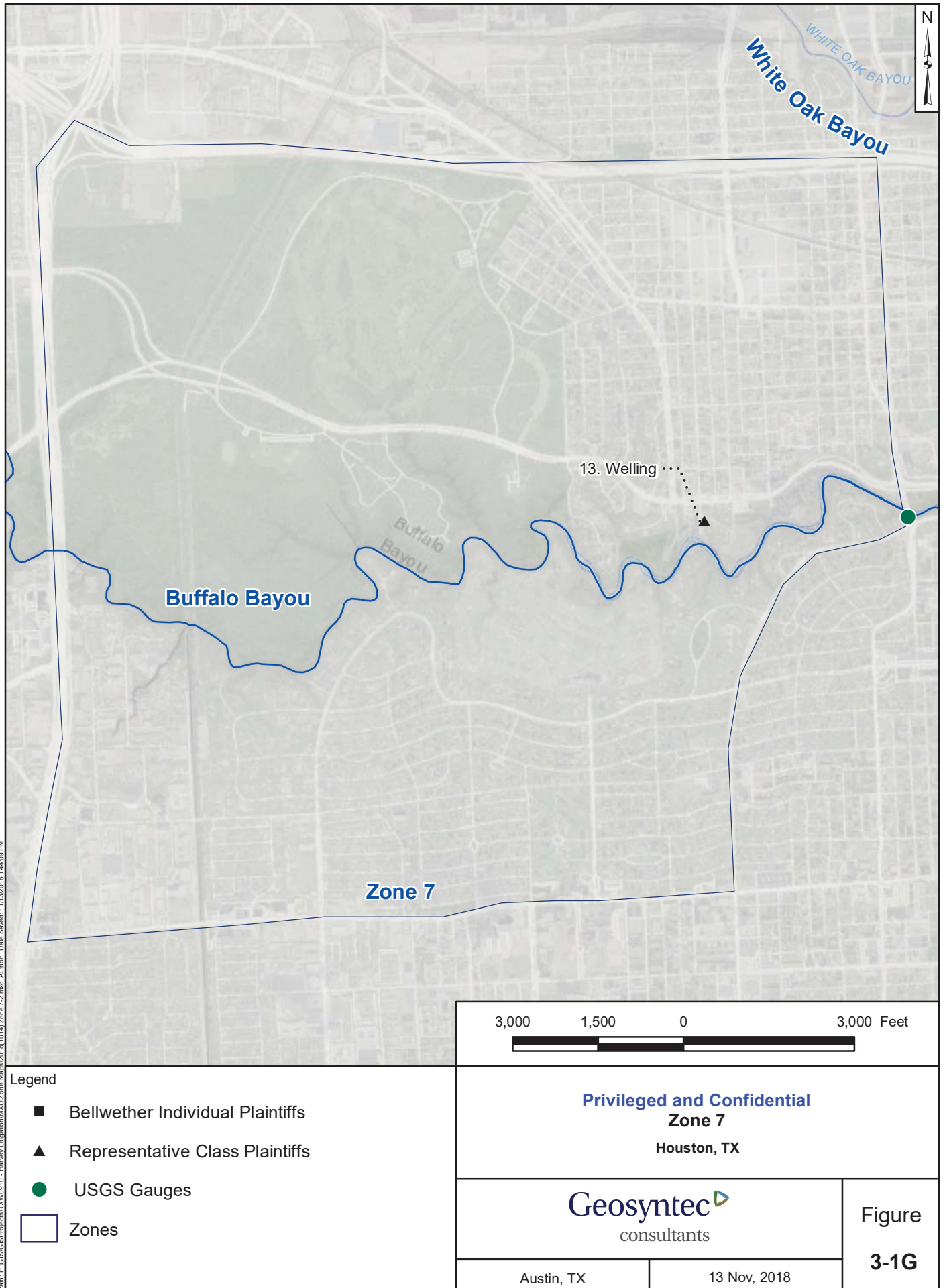












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SECTION 4

TIMELINE OF EVENTS AND OBSERVATIONS

4.1 Introduction

This section presents a brief overview of the reported timeline of events and observations that were analyzed during the development of opinions. Source data, supporting information, and supplemental analyses are provided in subsequent sections of this Report and as separate appendices, where referenced.

4.2 Timeline of Events based on Available Data

Gauge data, downstream test property owner plaintiff testimony, reported USACE gate outflow rates, and the USACE After Action Report (USACE, 2018) were reviewed to develop a general timeline of events and actions taken by the USACE. The timeline summarized in the outline below, together with **Figure 4-1** of the gauge data, establishes reported gate release rates and inundation levels. All reported dates are in 2017 during and following Hurricane Harvey in the Houston area. Property information is based on plaintiff name and number as indicated in **Table 3-1** above along with property inundation reported by the plaintiffs as indicated in **Table 4-1** in the following section.

- August 25 – Harvey makes landfall near Rockport, Texas; approximately one inch of rain falls in the Houston area beginning around 5:00 am
 - Properties reporting initial inundation based on testimony:
 - #11 Azar (minor inundation)
- August 26 – Rain continues, approximately 8.5 inches; pool levels within the reservoirs begin to rise
- August 27 – Rain continues, approximately 15.5 inches
 - Properties reporting initial inundation based on testimony:
 - #3 Memorial SMC (multiple buildings; not all may have been inundated)
 - #10 Beyoglu (reported minor inundation)
- August 27 into 28 – Reservoir gates opened and induced surcharge releases made downstream to Buffalo Bayou; pool levels in the reservoirs continue to rise; approximately 7.5 inches of rain
 - Addicks gates opened at no later than 1:00 am on August 28
 - peak discharge <3,000 cfs
 - peak pool level at 106.59 ft
 - Barker gates opened at no later than 1:15 am on August 28

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- peak discharge <2,700 cfs
 - peak pool level at 100.22 ft
- August 28
 - Properties reporting initial inundation based on testimony:
 - #1 Milton
 - #4 Good Resources
 - #6 Hollis
 - #11 Azar had minor inundation on August 25 but reported significant inundation starting August 28 resulting in up to 9.75 ft of inundation
 - #12 Stahl estimates inundation began on August 28 based on USGS gauges
 - #13 Welling
- August 29 – Uncontrolled releases (also referred to as “flanking flows”) around the spillway on the north end of Addicks occurs; approximately 2.5 inches of rain occurred and stopped
 - Addicks gates remained opened
 - peak discharge <6,500 cfs
 - peak pool level at 108.98 ft
 - uncontrolled releases (flanking flows) started at 7:15 am
 - Barker gates remained opened
 - peak discharge <5,000 cfs
 - peak pool level at 101.53 ft
 - Properties reporting initial inundation based on testimony:
 - #2 Shipos
 - #7 Silverman
 - #8 Godejord
- August 30 – Pool levels in both reservoirs at or near peaks; Barker was 80% full; Addicks was 100% full; no rain occurred
 - Addicks gates remained opened
 - peak discharge <6,400 cfs
 - overall peak pool level at 109.09 ft occurred at 7:00 am
 - uncontrolled releases (flanking flows) also occurred
 - Barker gates remained opened
 - peak discharge <5,000 cfs
 - overall peak pool level at 101.56 ft occurred at 6:00 am
 - Properties reporting initial inundation based on testimony:

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- #5 Aldred
 - #9 Cutts
- August 31 – pool levels begin to fall
 - Addicks gates remained opened
 - peak discharge <5,300 cfs
 - peak pool level at 109.02 ft
 - uncontrolled releases (flanking flows) also occurred
 - Barker gates remained opened
 - peak discharge <4,800 cfs
 - peak pool level at 101.37 ft
- September 1 – pool levels continue to fall
 - Addicks gates remained opened
 - peak discharge <5,300 cfs
 - peak pool level at 108.57 ft
 - uncontrolled releases (flanking flows) stopped around 8:30 pm
 - Barker gates remained opened
 - peak discharge <4,600 cfs
 - peak pool level at 100.80 ft
- September 2 – mandatory evacuation order issued by City of Houston
 - Addicks gates remained opened
 - peak discharge <5,200 cfs
 - peak pool level at 107.90 ft
 - Barker gates remained opened
 - peak discharge <4,600 cfs
 - peak pool level at 100.16 ft
- September 10 – Tailwater conditions ended at Barker
 - Barker tailwater conditions reported to end at elevation 77.28 ft at 7:00 am
- September 11 – Tailwater conditions ended at Addicks
 - Addicks tailwater conditions reported to end at elevation 73.71 ft at 7:00 pm
- September 18 – gate discharge rates ended
 - Addicks – gates closed at 6:15 pm
 - Barker – gates closed at 7:00 pm
- September 19 – gates opened again

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- Addicks – gates opened at 1:15 pm at <2,200 cfs until end of record in “morning report” spreadsheet on 10/13
- Barker – gates opened at 2:45 pm at <1,000 cfs until end of record in “morning report” spreadsheet on 9/25

Figure 4-1 presents a composite general timeline of events from 25 August through 12 September 2017. The gauge number of the four USGS gauges along Buffalo Bayou used in the development of the graph are indicated in the legend. The outflow from the reservoirs represents the composite discharge from the gates of the two reservoirs (Addicks and Barker). The flow rate is based on the USACE reported values per the USACE006304 spreadsheet. The precipitation values are based on an analysis of precipitation data for 44 gauges from 24 August to 30 September 2017 obtained from the HCFCD website (HCFCD, 2018). Thiessen polygons were generated for the precipitation gauges to account for the spatial variability in the precipitation (see **Appendix B**). Each Thiessen polygon was assigned the rain gauge that fell in it. An area weighed total precipitation was calculated based on the precipitation timeseries and area of Thiessen polygons. The precipitation analysis is detailed in **Appendix B**.

4.3 Plaintiff Testimony of Observed Conditions

According to downstream plaintiff testimony, **Table 4-1** below summarizes the reported estimated time of first inundation, the estimate of maximum observed inundation, and the duration/dates when the plaintiff could not access the property due to inundation (which is representative of the time duration that the property was inundated). Based on the testimony summarized in **Table 4-1**, downstream test properties #3, #10, and #11 reported to have minimal inundation prior to the USACE opening the gates.

The Elevation Certificates for each of the downstream test properties were reviewed in order to investigate the slab elevation of the building structure on the property. The slab elevation was compared to the estimate of maximum observed inundation depth according to the plaintiff testimony in order to calculate an estimate of maximum water surface elevation. **Table 4-2** presents the slab elevation and calculated estimate of maximum observed water surface elevation for each of the 13 downstream test properties.

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Table 4-1: Summary of Plaintiff Testimony Regarding Inundation

Number	Plaintiff Name	Estimate of First Inundation	Estimate of Maximum Observed Inundation	Duration Property was Inaccessible
1	Milton, Virginia and Arnold	8/28, 3:00 am	4.33 ft	Until 9/10
2	Shipos, Jennifer	8/29	1.25 ft	Until 9/4
3	Memorial SMC Investment 2013 LP	8/27, late night	5.5 to 6.0 ft	Until 9/11
4	Good Resources LLC	8/28, 11:19 am	3.33 ft	Until 9/10
5	Aldred, Val	8/30	1.5 ft	Until 9/2
6	Hollis, Wayne and Peggy	8/28	3.75 ft	Until 9/9
7	Silverman, Peter and Zhennia	8/29	1.5 ft	Until 9/8
8	Godejord, Arnstein and Igna	8/29	2.83 ft	Until 9/8
9	Cutts, Paul and Dana	8/30, 3:00 am	0.67 ft	Until 9/7
10	Beyoglu, Jana and Gokhan	8/27	2.0 ft on 8/27; up to 4.0 ft on 8/29	Until 9/6
11	Azar, Phillip	8/25	Up to 9.75 ft on 8/28	Until 9/10
12	Stahl, Tim	8/28	3.33 ft	Until 8/29
13	Welling, Shawn	8/28	10.0 ft	Until 9/1

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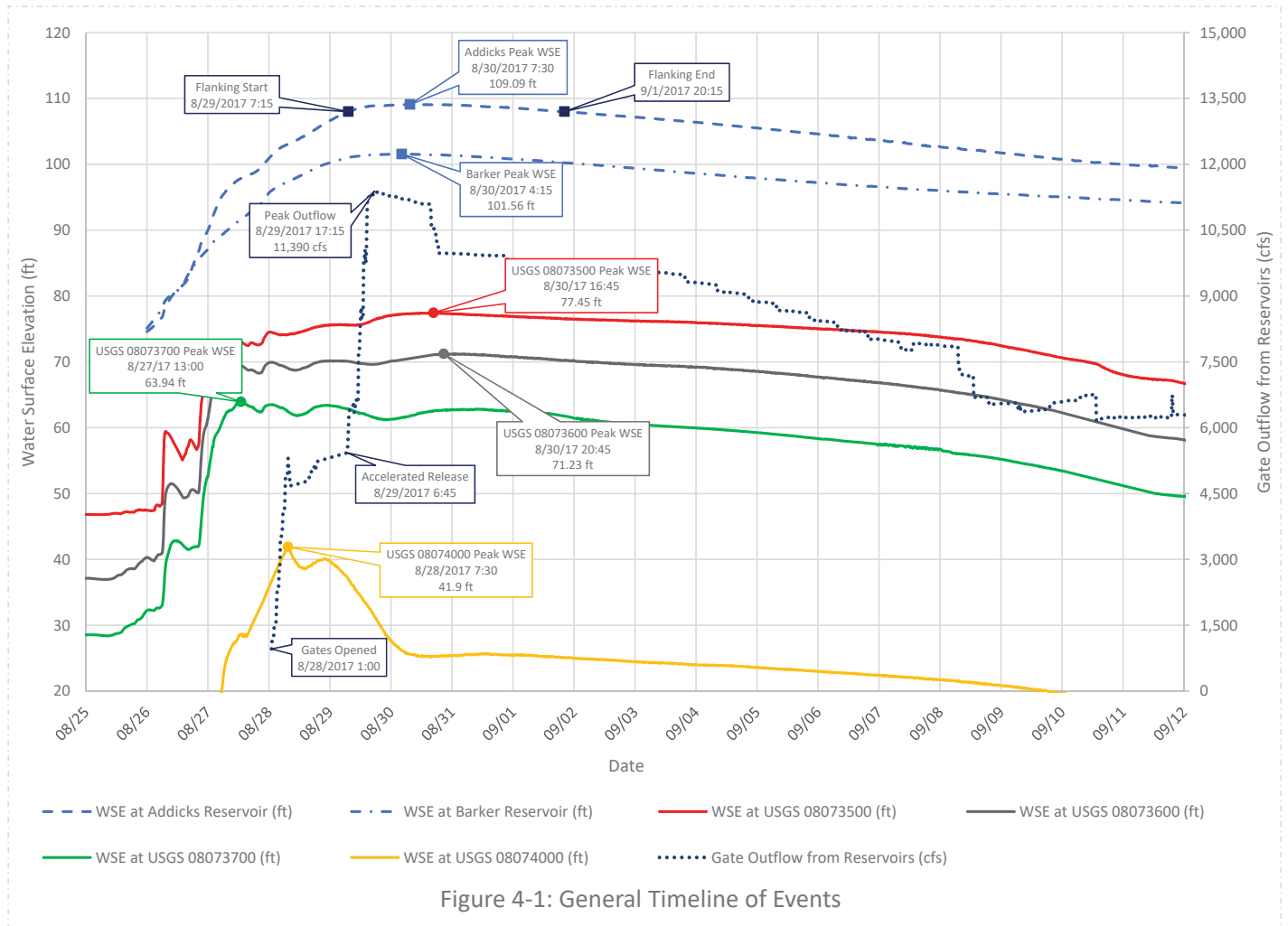
Table 4-2: Slab Elevations and Plaintiff Testimony Regarding Water Surface Elevations

Number	Plaintiff Name	Elevation Certificate Slab Elevation (ft)	Estimate of Maximum Observed Water Surface Elevation (ft)
1	Milton	78.61	82.94
2	Shipos	80.90	85.15
3	Memorial SMC ^a	77.00 to 77.90	83.00 to 83.40
4	Good Resources	78.50	81.83
5	Aldred	80.20	81.70
6	Hollis	76.50	80.25
7	Silverman	75.09 ^b	76.59
8	Godejord	74.00	76.83
9	Cutts	72.00	72.67
10	Beyoglu	70.10	74.10
11	Azar	48.94	58.69
12	Stahl	52.10	55.43
13	Welling	39.40 ^c	49.40

Notes: ^a The #3 Memorial SMC property consists of approximately 15 different building structures which have a range of slab elevations according to their corresponding Elevation Certificates.

^b Elevation Certificate was not available for #7 Silverman although the property had been surveyed with a slab elevation of 75.09 ft by South Texas Surveying Associates, Inc.

^c The slab elevation of 39.40 ft for #13 Welling corresponds to the lowest elevation of machinery or equipment servicing the building; the slab elevation of the first floor is 47.40 ft both of which are reported on the Elevation Certificate. The reported inundation depth based on plaintiff testimony is with respect to the machinery elevation below the first floor elevation.



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SECTION 5

METHODOLOGY OVERVIEW

5.1 Methodology Summary

Several lines of evidence, models, testimony, and data were used to develop the opinions presented in **SECTION 7**. An overview of these methods is described here with specific details discussed in the referenced appendices. As part of these methods, both the reported gate releases during Hurricane Harvey in general accordance with the Induced Surcharge Operations Schedule documented in the 2012 WCM (USACE, 2012) referred to as the “gates opened” scenario, as well as a hypothetical “gates closed” scenario if the USACE had not opened the gates during Hurricane Harvey in accordance with the normal flood control regulation of the 2012 WCM were considered. An overview of hydraulic model results is provided in **SECTION 6**.

5.2 HEC-HMS Model Methodology

Dr. Bedient’s HEC-HMS model, which was modified from the HCFCD HEC-HMS model, was used for this analysis. The hydrologic model results were compared to observed USGS flow data during Hurricane Harvey. Dr. Bedient further modified this HEC-HMS model to consider a gates closed scenario with no flanking flows (i.e., an infinitely large reservoir capacity). The purpose of the HEC-HMS gates closed model was to evaluate and quantify precipitation-only flows within Buffalo Bayou. Flanking flows and where they occur from the reservoirs were quantified using the enhanced 2D HEC-RAS model (see **Section 5.3.1** below).

Dr. Bedient’s HEC-HMS model was modified to include USGS measured flow rates near Addicks and Barker Reservoirs instead of the USACE calculated gate outflow rates. In addition, flanking flows were included where they return to Buffalo Bayou in the HEC-HMS model. The unsteady flow rates within Buffalo Bayou were calculated from these modifications to Dr. Bedient’s HEC-HMS model for the gates opened and gates closed hydraulic model scenarios. The flow rates within Buffalo Bayou are considered “unsteady” since they vary with time. The unsteady flows within Buffalo Bayou obtained from the HEC-HMS model and the flanking flows obtained from the enhanced 2D HEC-RAS model were used as input to the 1D HEC-RAS model for both the gates opened and gates closed scenarios. **Appendix B** presents additional details associated with the development of the HEC-HMS hydrology model.

5.3 HEC-RAS Model Methodology

HEC-RAS models were utilized to predict inundation depths related to the gates opened and gates closed hydraulic model scenarios. In both the gates opened and gates closed scenarios, water within Addicks Reservoir is expected to flank around the ends of the dam when the storage capacity of the reservoir is exceeded, and eventually this water will return to Buffalo Bayou at

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downstream locations. The enhanced 2D HEC-RAS model was used to quantify the amount and identify the location of where the flanking flows return to Buffalo Bayou. The 1D HEC-RAS model was used to quantify the resulting water surface elevation for both scenarios while taking into account the flanking flows for each scenario.

5.3.1 2D HEC-RAS Model

The original 2D HEC-RAS model developed by USACE to analyze the two gate operation scenarios was used as the basis for the 2D HEC-RAS analysis. In particular, model enhancements were made to the USACE 2D HEC-RAS model to gain a general understanding of downstream flow rates and inundation depths. These model enhancements are described in more detail in **Appendix C** with specific modeling results related to flanking flows presented in **Section 6.2**. The enhanced 2D HEC-RAS model was developed to investigate the gates opened and gates closed scenarios primarily to assess when flanking flows are expected to occur under both scenarios, where those flows might be conveyed downstream, and the resulting flow rates and locations where the flanking flows returned to Buffalo Bayou. As further discussed in **Section 6.2** below, the gates closed scenario analysis results in larger flanking flows at Addicks Reservoir, but flanking flows would not have occurred at Barker Reservoir. Furthermore, the enhanced 2D HEC-RAS model is useful for understanding the tools and models available to USACE during Hurricane Harvey for the prediction of downstream inundation.

Although the enhanced 2D HEC-RAS model can provide good estimates of where flanking flows are expected to occur on a specified terrain, the enhanced 2D HEC-RAS model is not as precise in approximating actual flow depths and extent of inundation due to the lack of detailed channel geometry, bridge structures, culvert structures, and other hydraulic controls. Furthermore, HEC-RAS is primarily a hydraulic modeling tool and was not originally developed for detailed hydrologic modeling. Based on these limitations of the 2D HEC-RAS model, a 1D HEC-RAS model was used to explicitly represent the hydraulic controls to approximate flow depths along Buffalo Bayou, along with a HEC-HMS model to conduct hydrologic modeling to predict runoff flow rates into Buffalo Bayou.

5.3.2 1D HEC-RAS Model

Dr. Bedient's 1D HEC-RAS model (Bedient, 2018) for the upper portions of Buffalo Bayou immediately downstream of Addicks and Barker Reservoirs was used for this analysis. Dr. Bedient's 1D HEC-RAS model was combined with the HCFCD 1D HEC-RAS model for the entire length of Lower Buffalo Bayou. The combined 1D HEC-RAS model explicitly represents hydraulic controls and will better approximate flow depths within Buffalo Bayou than the 2D HEC-RAS model. It is our understanding that the basis for Dr. Bedient's 1D HEC-RAS model is the HCFCD regulatory model (HCFCD, 2018a). However, the HCFCD 1D HEC-RAS model is a steady state floodplain model and required minor alterations to allow for unsteady state flows as described in **Appendix B**.

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The 1D HEC-RAS model gates opened scenario was developed to simulate the baseline condition, as it occurred during Hurricane Harvey and approximate the water surface elevation along Buffalo Bayou. The 1D HEC-RAS model gates closed scenario was developed to simulate the alternate condition if the gates had not been opened in accordance with the normal flood control regulation of the 2012 WCM. A single geometry file was used for both scenarios. The hydraulic features, such as bridges and channel geometry, represented in the 1D HEC-RAS model are consistent between the gates opened and gates closed model scenarios. The only difference between the two modeled scenarios is the flow inputs; the flow inputs are described below.

- (i) The unsteady stormwater runoff flow rates from the watershed directly tributary to Buffalo Bayou were obtained from the HEC-HMS model. These flow rates are consistent between the two modeled scenarios.
- (ii) Reservoir release rates reported by USGS gauges from the two reservoirs were used in the gates opened scenario. Under the gates closed scenario, the gates were assumed to have no flow.
- (iii) Uncontrolled flanking flows from Addicks Reservoir when the pool level within the reservoir exceeds the natural ground elevation at the end of the dam were obtained from the enhanced 2D HEC-RAS model for both the gates opened and gates closed scenarios. Each scenario had unique flanking flows that were used in the corresponding modeled scenario.

5.3.3 Evaluation and Comparison of Model Output

The modeled water surface elevation (WSE) from the combined 1D HEC-RAS model was used to support the formulation of each opinion as to which of the 13 downstream test properties were potentially impacted by inundation due to the USACE's decision to open the gates at Addicks and Barker Reservoirs according to the 2012 WCM. The modeled WSE from the combined 1D HEC-RAS model for both scenarios compared to the downstream test property slab elevation allows for an estimation of inundation depth at each downstream test property, as well as an estimate of the inundation duration and timing associated with the gates opened scenario. The model results, together with plaintiff testimony as to observed inundation depths and durations, form the basis of the opinions.

5.4 Analysis of Observed and Reported Conditions Methodology

In order to further support and interpret the combined 1D HEC-RAS modeling results related to inundation depths and durations, other lines of evidence related to inundation at the downstream test properties were investigated and relied upon. The deposition testimony from the 13 downstream property owners (see summary in **Section 4.3**) was reviewed and relied upon in the formulation of each of the opinions. Other information relied upon included the USGS gauge

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information, high water marks collected by multiple agencies, and published information associated with the current FEMA FIS (FEMA, 2017).

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SECTION 6

OVERVIEW OF MODEL RESULTS

6.1 HEC-HMS Model Results

The HEC-HMS model initially prepared by Dr. Bedient as summarized in his expert report (Bedient, 2018) along with the modifications made to this model by Geosyntec as described in **Appendix B** was used to develop the 1D HEC-RAS model inputs. The flow hydrographs reported from the HEC-HMS model, along with the flanking flows obtained from the enhanced 2D HEC-RAS model, were used as the primary flow inputs into the combined 1D HEC-RAS model. At the upstream boundary of the model near the Addicks and Barker Reservoirs, the measured USGS gauge flows are used as the initial input. As flows are added downstream due to either stormwater runoff or flanking flows from Addicks Reservoir, the resulting flow hydrographs are used as input to the 1D HEC-RAS model. A detailed description of the HEC-HMS model development and results are presented in **Appendix B**.

6.2 Enhanced 2D HEC-RAS Model Results

The enhanced 2D HEC-RAS model was developed using the USACE 2D HEC-RAS model as the basis for model development. A detailed description of the model enhancements are provided in **Appendix C**. The purpose of the enhanced 2D HEC-RAS model was to assess when flanking flows would occur, identify where the flows would be conveyed downstream, and quantify flow rates as they returned to Buffalo Bayou.

The enhanced 2D HEC-RAS model quantified the pool levels, flanking flow rates, and the locations of where flanking flows would return to Buffalo Bayou under the two modeling scenarios. **Table 6-1** presents the peak pool levels and flanking flows at Addicks and Barker Reservoirs for the gates closed scenario simulation compared to observed conditions during Hurricane Harvey. Although pool levels within both Addicks and Barker Reservoirs would have been higher under the gates closed scenario, Barker pool levels would still not have exceeded the natural ground at the end of the dam during Hurricane Harvey, thereby avoiding flanking flows. The simulated gates closed scenario pool levels are 1.17 ft and 2.40 ft higher within Addicks and Barker Reservoirs, respectively. Flanking flows were only predicted for Addicks Reservoir under both the gates opened and gates closed scenarios; no flanking flows were predicted for Barker Reservoir under either scenario during Hurricane Harvey. The total peak flanking flow leaving Addicks Reservoir was obtained from the enhanced 2D HEC-RAS model as 5,710 cfs for the gates closed scenario, compared to approximately 2,000 cfs for the gates opened conditions as reported during the Kauffman deposition. These flanking flows are split between the four return locations at Buffalo Bayou and are also attenuated between the end of Addicks Reservoir and the return locations.

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Figure 6-1 and **Figure 6-2** present the observed and modeled outflows and pool levels at Addicks and Barker Reservoirs, respectively. **Figure 6-3** and **Figure 6-4** present the maximum inundation extents from the enhanced 2D HEC-RAS model results for the gates opened and gates closed scenarios, respectively. The gates closed scenario shows no flanking flows occurred for Barker Reservoir. Furthermore, the flanking flows that occur at Addicks Reservoir are shown to be conveyed farther downstream before they return to Buffalo Bayou and bypass many of the downstream test properties. For example, flanking flows from Addicks Reservoir return to Buffalo Bayou via Turkey Creek, Rummel Creek, Spring Branch, and White Oak Bayou.

Table 6-2 below presents the summary of the enhanced 2D HEC-RAS model results; additional model results are presented in **Appendix C**.

6.3 Combined 1D HEC-RAS Model Results

A combined 1D HEC-RAS model was developed using Dr. Bedient's 1D HEC-RAS model and the HCFCF 1D HEC-RAS model. The inflow hydrographs were obtained for the two scenarios from the HEC-HMS model and the flanking flows from the enhanced 2D HEC-RAS model as described in **Section 5.3.2**.

After inputting the HEC-HMS flows for the gates opened scenario, the resulting 1D HEC-RAS produced flow hydrographs are very consistent with the recorded flow hydrographs at four of the USGS gauges along Buffalo Bayou (USGS 08072600 State Hwy 6; USGS 08073500 Near Addicks; USGS 08073600 W Belt Dr; USGS 08073700 Piney Point). As was observed with the HEC-HMS analysis, the gates closed scenario in HEC-RAS produced flow hydrographs that show a very distinct reduction in flow after the time the gates would have opened. To visualize the comparison of the USGS recorded flows, the 1D HEC-RAS gates open flow, and the 1D HEC-RAS gates closed flow; a series of graphical overlays have been prepared and included in **Appendix B**.

A summary of the water surface elevation and the corresponding flow rate at each test property is presented in **Table 6-3** for the two scenarios. Along with the peak water surface elevation, the slab elevation of each test property is indicated. In addition to the peak water surface elevation, the results of the 1D HEC-RAS model were used to evaluate and quantify the time the test property was likely inundated. **Figure 6-5** and the associated sub-figures present the water surface elevation hydrographs near each of the 13 downstream test properties for both scenarios.

6.4 Analysis of Observed and Reported Conditions Results

The combined 1D HEC-RAS hydraulic model results presented in **Table 6-3** together with the deposition testimony for each of the 13 downstream test property plaintiffs presented in **Table 4-1** were used to approximate the inundation depth at each property based on the building slab elevations as presented in **Table 6-4**. Furthermore, **Table 6-5** presents the deposition testimony for the reported duration of inundation at each of the 13 downstream test properties together with

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the modeled duration of inundation based on the duration the gates opened scenario WSE is higher than the peak gates closed scenario WSE. These tables, together with the WSE hydrographs in **Figure 6-5** as well as plaintiff testimony form the basis of opinions.

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Table 6-1: Summary of Gates Closed Enhanced 2D HEC-RAS Model

	Modeled Gates Closed Scenario	Gates Opened Observed Conditions
Addicks Peak Pool Level (ft)	110.26	109.09
Barker Peak Pool Level (ft)	103.96	101.56
Addicks Peak Gate Outflow (cfs)	0	6,440 ^a
Barker Peak Gate Outflow (cfs)	0	4,990 ^a
Addicks Peak Flanking Flow (cfs)	5,710	~2,000 ^b
Barker Peak Flanking Flow (cfs)	0	0
Addicks Timing of Peak Flanking Flow (cfs)	3:45 am on 31 August 2017	7:00 am on 30 August 2017

Notes: ^a The calculated gate outflow rates are based on tailwater conditions reported in the USACE “morning report” spreadsheet; actual gate outflow rates may have been higher according to USGS gauge measurements.

^b The reported flanking flow rate is based on Kauffman deposition.

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Table 6-2: Summary of Enhanced 2D HEC-RAS Model Flanking Flow Results

Inflow Location	Peak Return Flanking Flow for Gates Opened Scenario (cfs)	Peak Return Flanking Flow for Gates Closed Scenario (cfs)
Turkey Creek	955	1,916
Rummel Creek	10	829
Spring Branch	173	1,231
White Oak Bayou	457	1,438

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Table 6-3: Summary of Combined 1D HEC-RAS Model Results – Test Properties

Location	Slab Elevation (ft)	Modeled Gates Opened Peak WSE (ft)	Modeled Gates Closed Peak WSE (ft)	Modeled Gates Open Peak Flow (cfs)	Modeled Gates Closed Peak Flow (cfs)
#1 Milton	78.61	82.78	79.42	4,965	3,797
#2 Shipos	80.90	82.53	79.09	4998	3,709
#3 Memorial SMC ^a	77.00 to 77.90	82.48	79.01	5,016	3,787
#4 Good Resources ^a	78.50	82.43	78.92	5,046	3,933
#5 Aldred	80.20	82.13	78.79	12,133	4,635
#6 Hollis	76.50	80.80	77.38	13,106	8,749
#7 Silverman	75.09	77.81	74.56	13,025	8,299
#8 Godejord	74.00	77.29	74.10	12,994	8,223
#9 Cutts	72.00	72.13	69.79	12,600	8,546
#10 Beyoglu	70.10	67.17	65.96	12,537	10,014
#11 Azar	48.94	55.91	55.91	12,502	11,845
#12 Stahl	52.10	52.22	52.22	17,502	17,502
#13 Welling	39.40	41.87	41.87	20,372	20,372

Notes: ^a #3 Memorial SMC and #4 Good Resources are located along Langham Creek downstream from the Addicks Reservoir outlet structure which is a tributary to Buffalo Bayou. The 1D HEC-RAS model represents Buffalo Bayou and does not include a Langham Creek reach. Therefore, the modeled peak WSE and flows are based on Buffalo Bayou conditions.

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Table 6-4: Summary of Downstream Test Property Inundation Depths

Downstream Test Property	Slab Elevation (ft)	Estimate of Maximum Observed Inundation (ft)	Modeled Gates Opened Peak Inundation (ft)	Modeled Gates Closed Peak Inundation (ft)	Difference Between Gates Opened and Gates Closed WSE (ft)
#1 Milton	78.61	4.33	4.17	0.81	3.36
#2 Shipos	80.90	1.25	1.63	0.00	3.44
#3 Memorial SMC	77.00 to 77.90	5.50 to 6.00	5.48	2.01	3.48
#4 Good Resources	78.50	3.33	3.93	0.42	3.51
#5 Aldred	80.20	1.50	1.93	0.00	3.34
#6 Hollis	76.50	3.75	4.30	0.88	3.42
#7 Silverman	75.09	1.50	2.72	0.00	3.25
#8 Godejord	74.00	2.83	3.29	0.10	3.19
#9 Cutts	72.00	0.67	0.13	0.00	2.34
#10 Beyoglu	70.10	4.00	0.00	0.00	1.21
#11 Azar	48.94	9.75	6.97	6.97	0.00
#12 Stahl	52.10	3.33	0.12	0.12	0.00
#13 Welling	39.40	10.00	2.47	2.47	0.00

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Table 6-5: Summary of Downstream Test Property Inundation Durations

Downstream Test Property	Reported Inundation Duration (days)	Modeled Gates Closed Peak WSE (ft)	Duration of Gates Opened WSE Greater Than Gates Closed Peak WSE (days)
#1 Milton	12.9	79.42	13.4
#2 Shipos	6.0	79.09	13.4
#3 Memorial SMC	14.0	79.01	13.5
#4 Good Resources	12.5	78.92	13.5
#5 Aldred	3.0	78.79	12.8
#6 Hollis	12.0	77.38	13.2
#7 Silverman	10.0	74.56	13.2
#8 Godejord	10.0	74.10	13.2
#9 Cutts	7.9	69.79	9.6
#10 Beyoglu	10.0	65.96	5.3
#11 Azar	16.0	N/A	12.1 ^a
#12 Stahl ^b	1.0	N/A	N/A
#13 Welling ^b	4.0	N/A	N/A

Notes: ^a The “Duration of Gates Opened WSE Greater Than Gates Closed Peak WSE (days)” for #12 Azar was calculated as the duration from when the gates closed WSE receded below the slab elevation to the time when the gates opened WSE receded below the slab elevation.

^b Although the gates opened scenario inundation duration is expected to be longer than the gates closed scenario for properties #12 Stahl and #13 Welling, the longer duration is dependent on the selected elevation. In general, Figures 6-5L and 6-5M show an increase in the inundation duration on the order of up to twelve days depending on the selected elevation.

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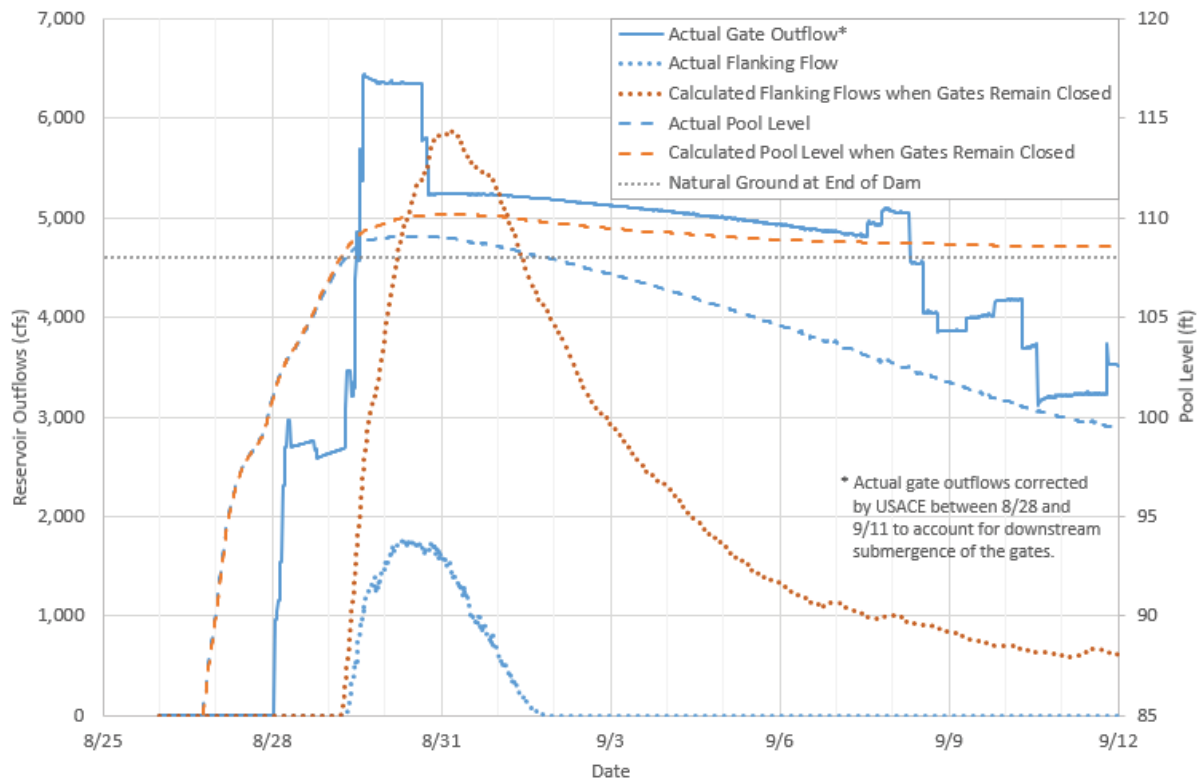


Figure 6-1: Observed and Simulated Outflows and Pool Levels at Addicks Reservoir

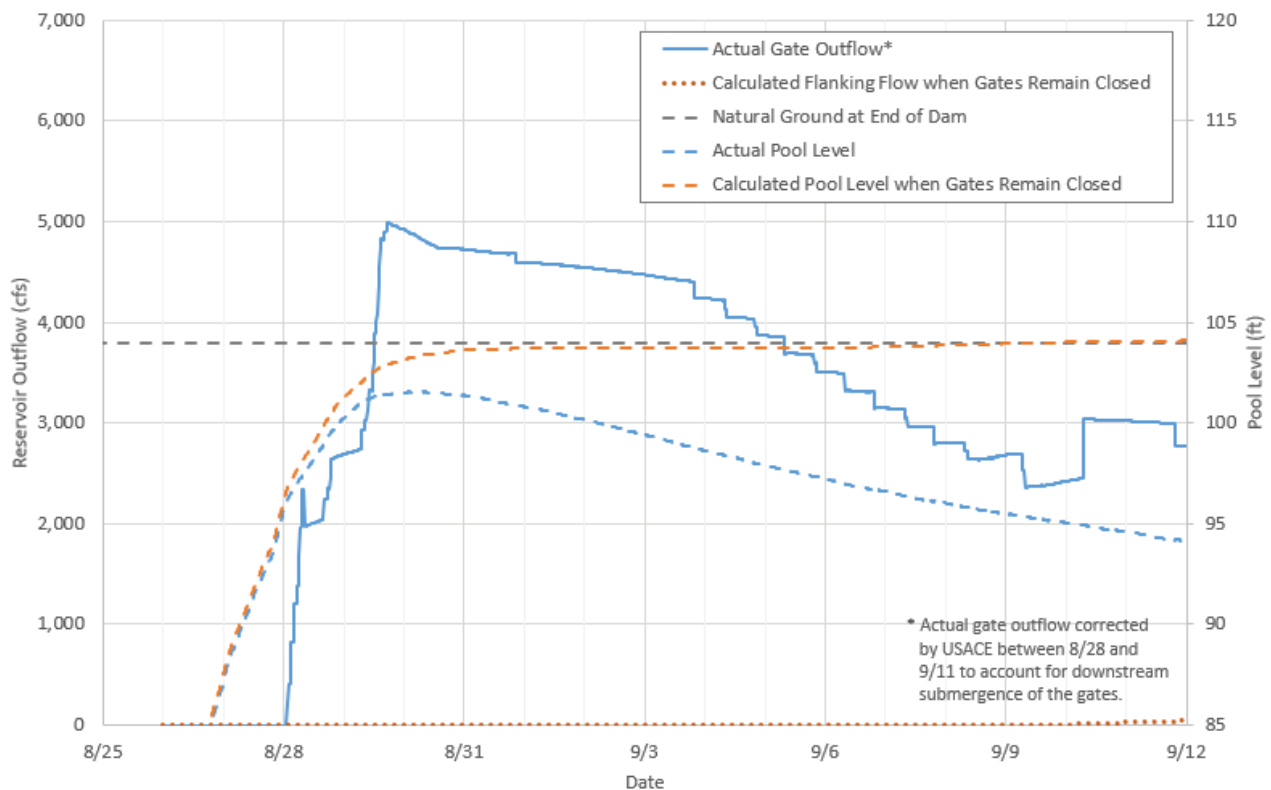
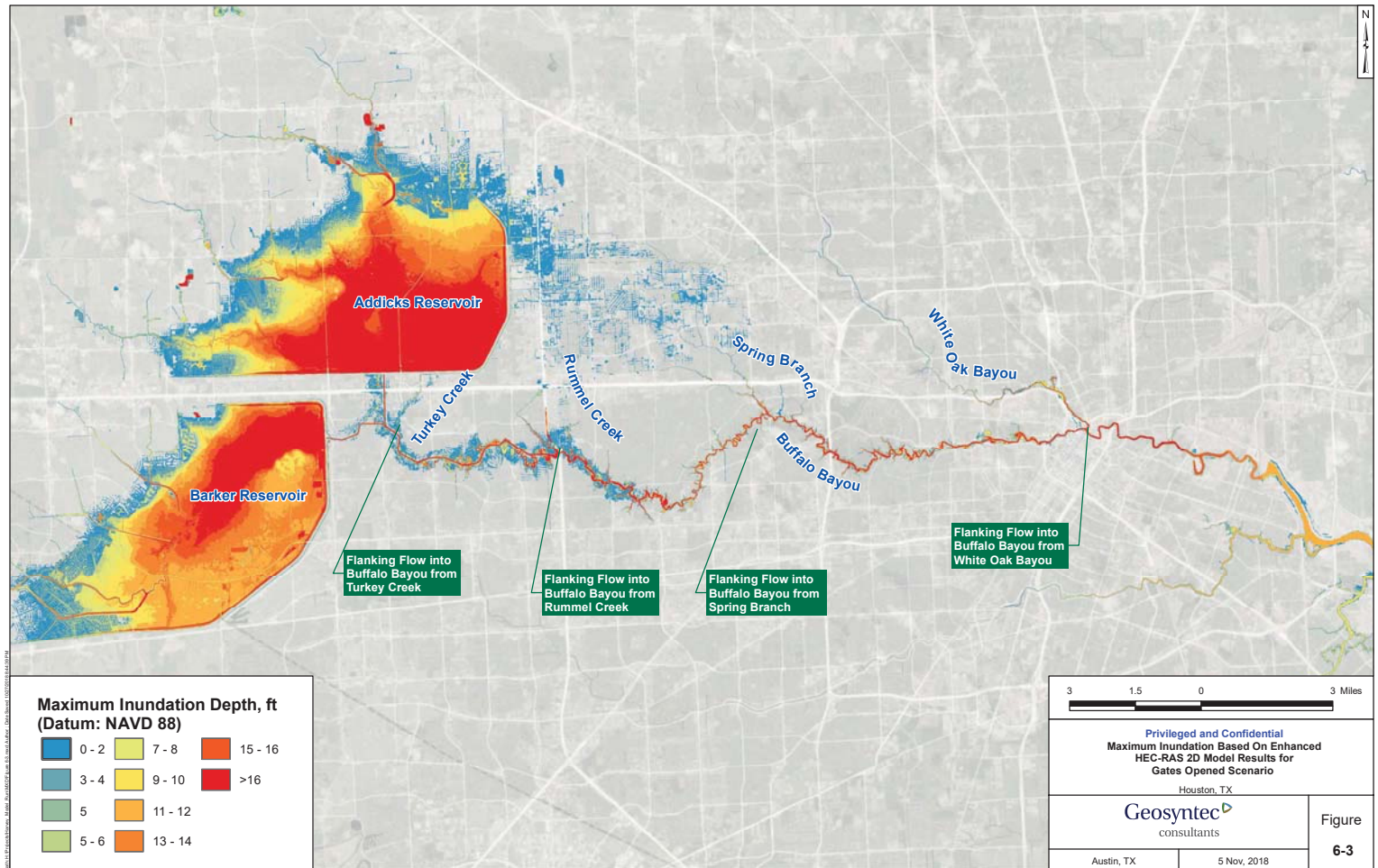
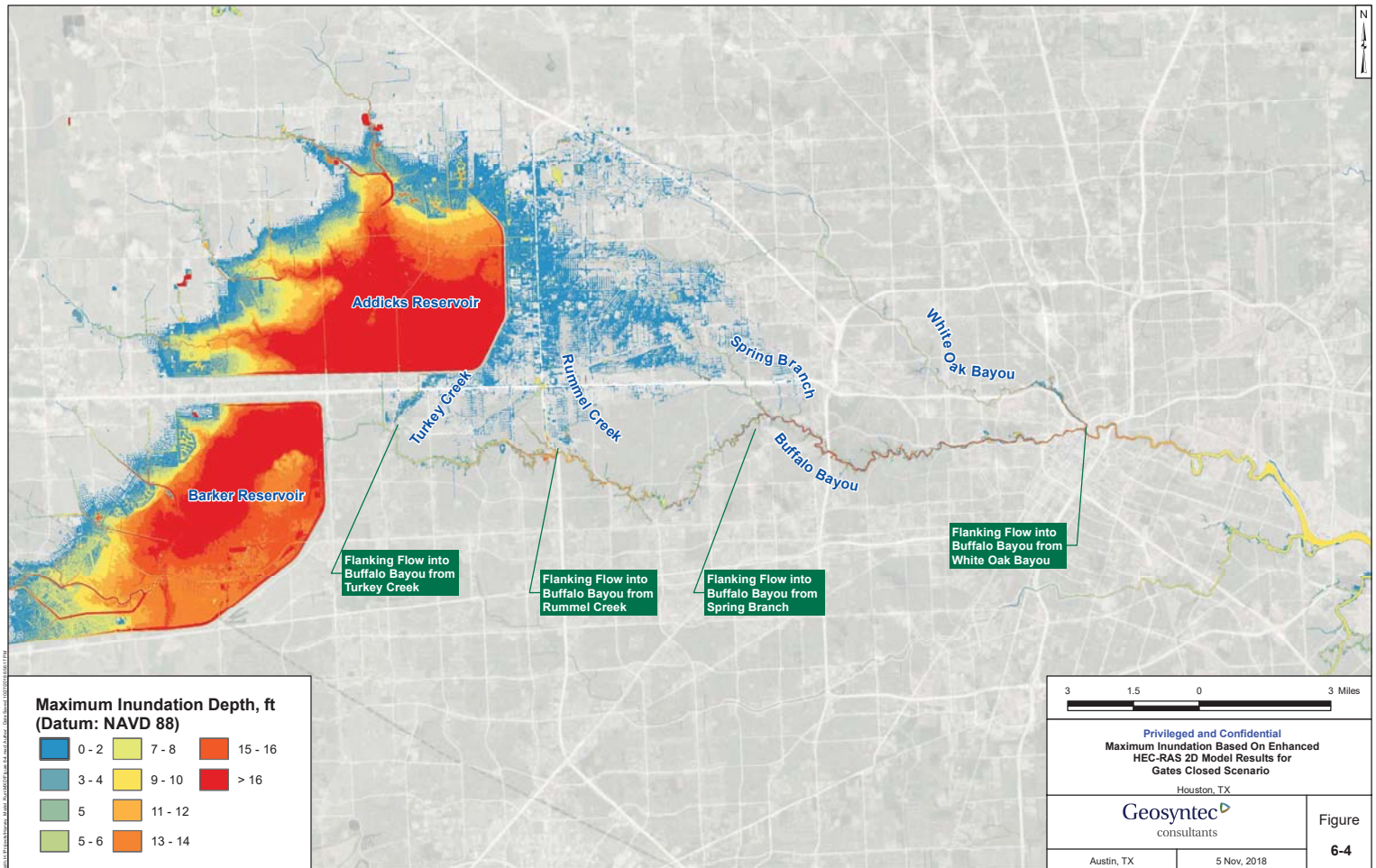


Figure 6-2: Observed and Simulated Outflows and Pool Levels at Barker Reservoir





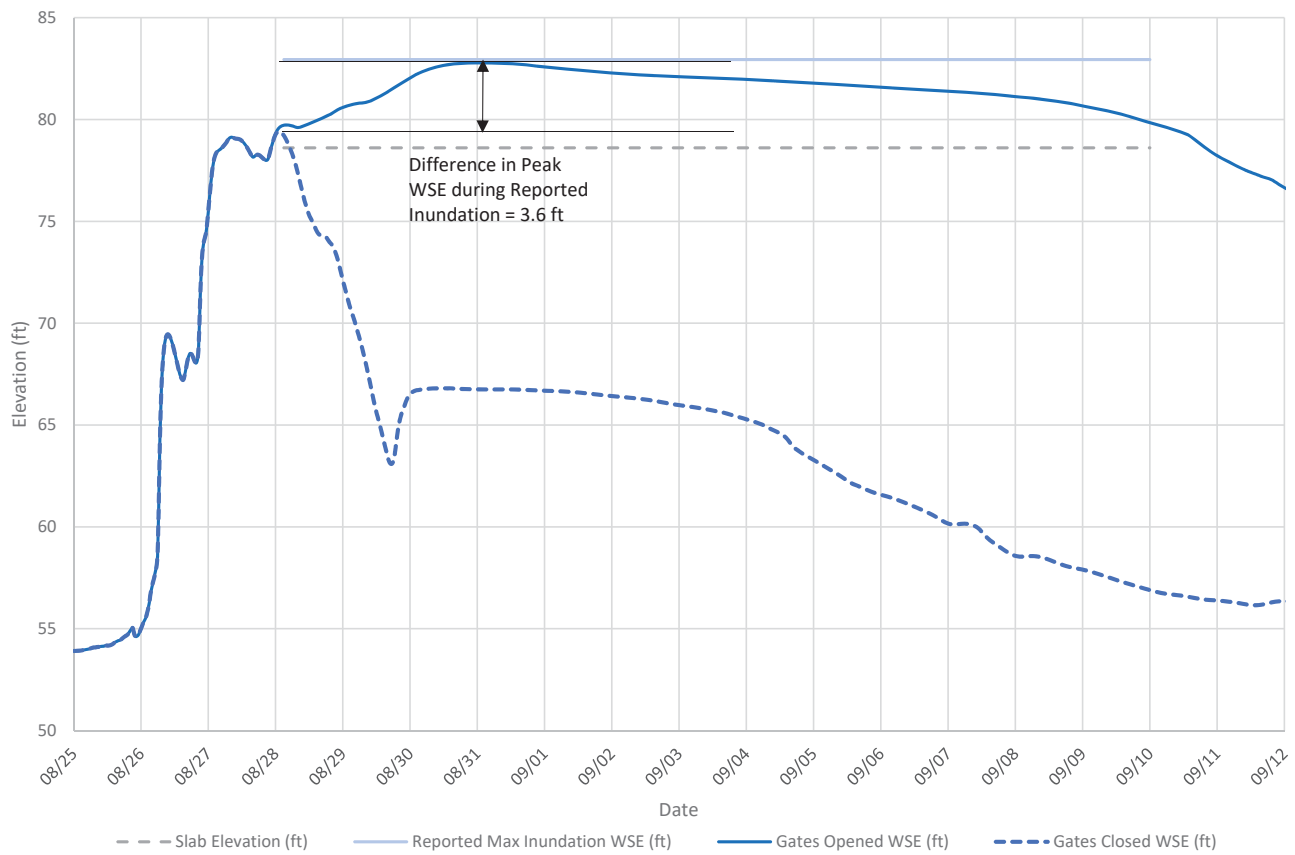


Figure 6-5A: Elevation Hydrograph for #1 Milton

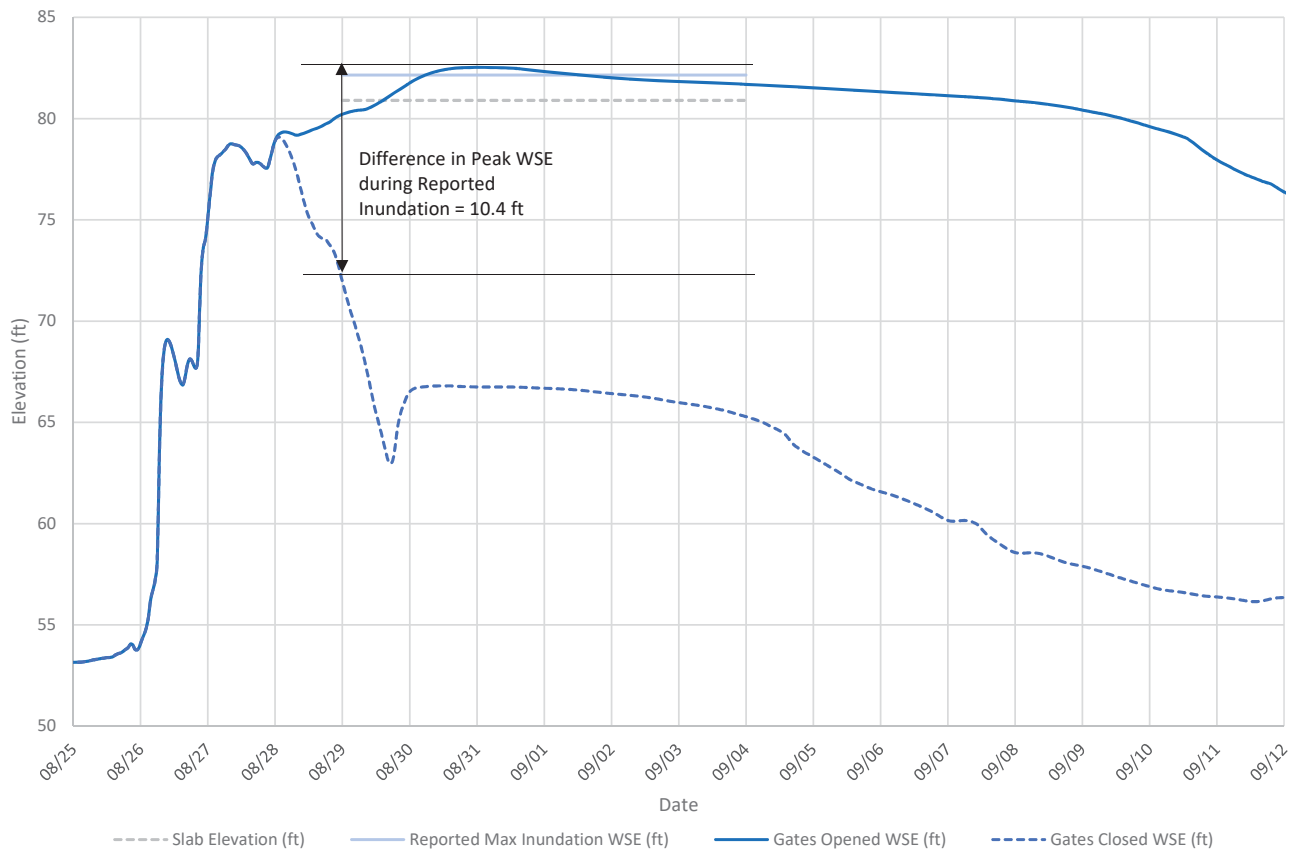


Figure 6-5B: Elevation Hydrograph for #2 Shipos

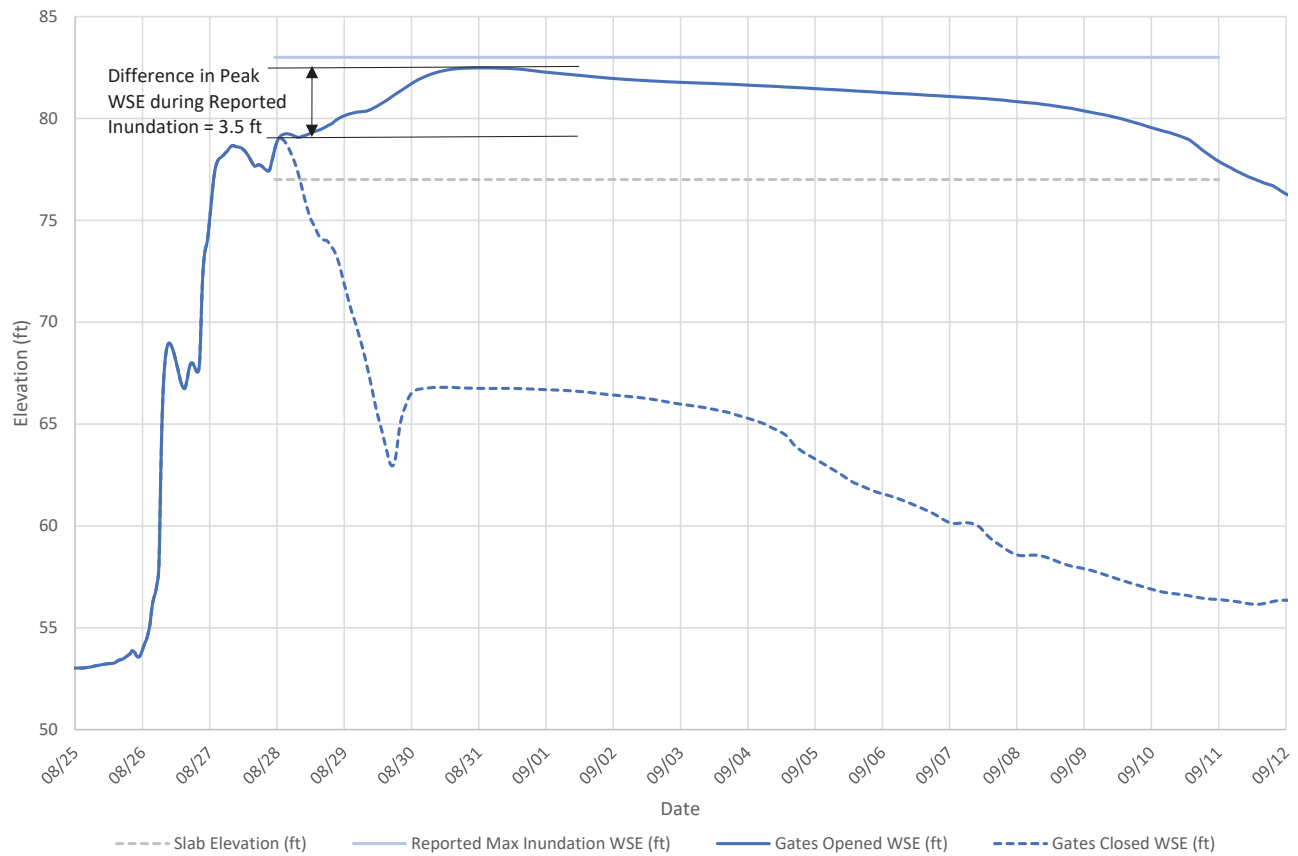


Figure 6-5C: Elevation Hydrograph for #3 Memorial SMC

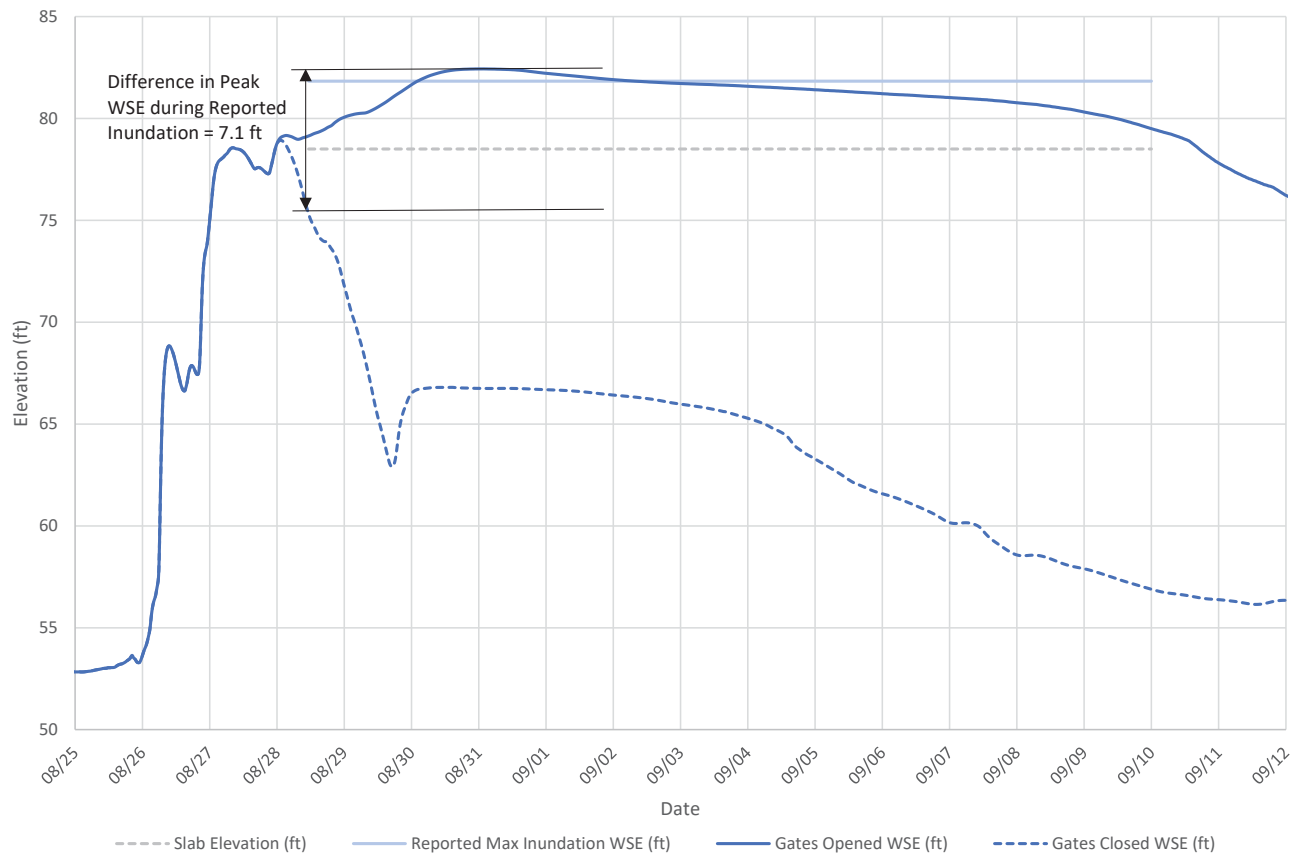


Figure 6-5D: Elevation Hydrograph for #4 Good Resources

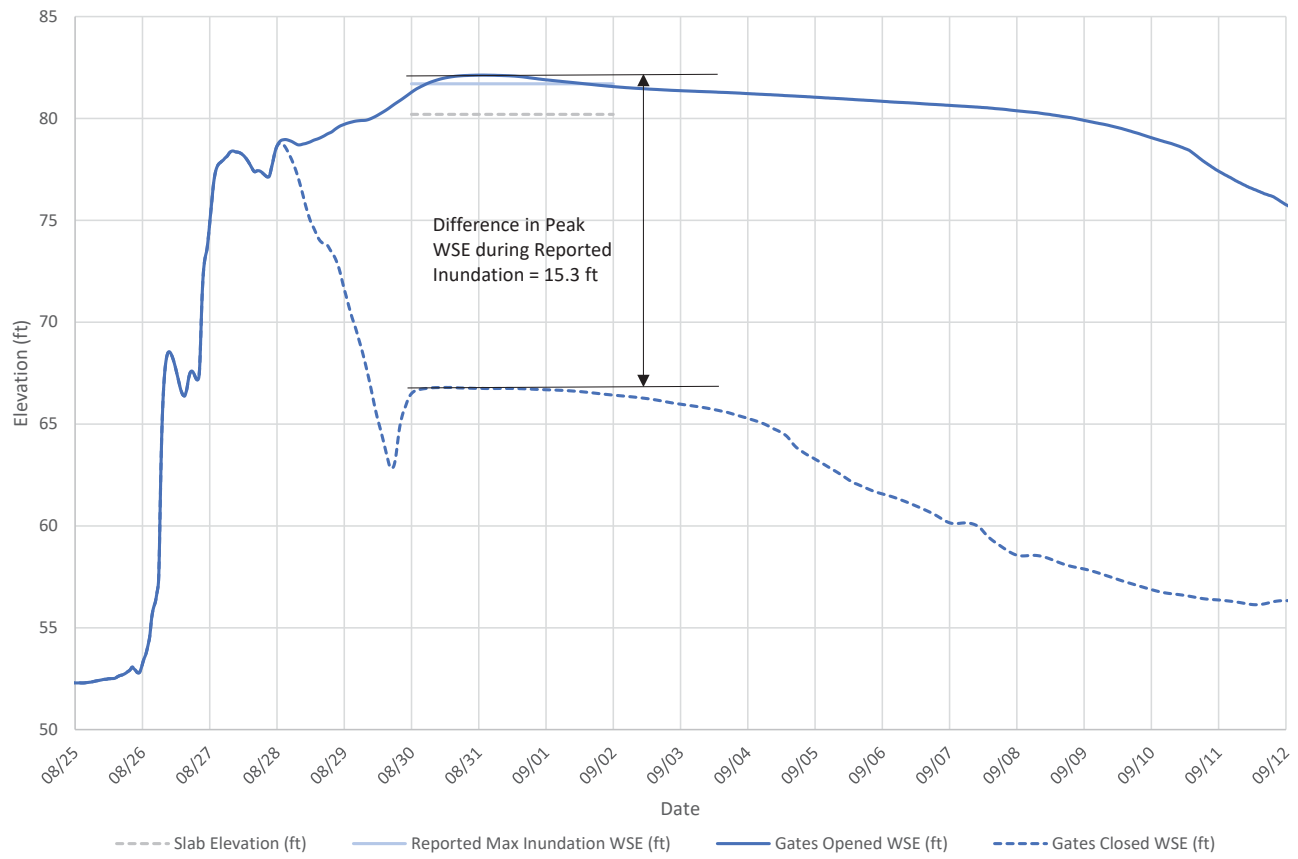


Figure 6-5E: Elevation Hydrograph for #5 Aldred

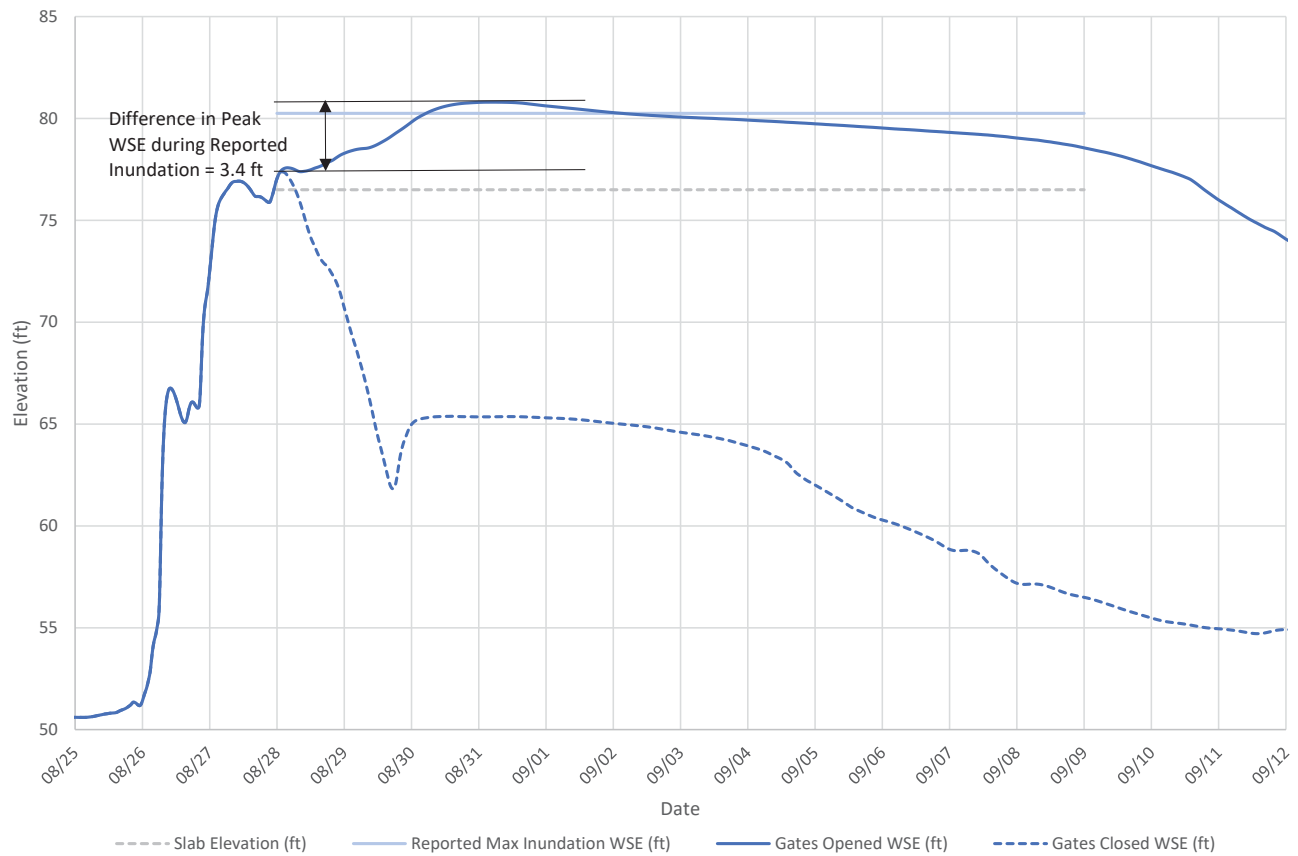


Figure 6-5F: Elevation Hydrograph for #6 Hollis

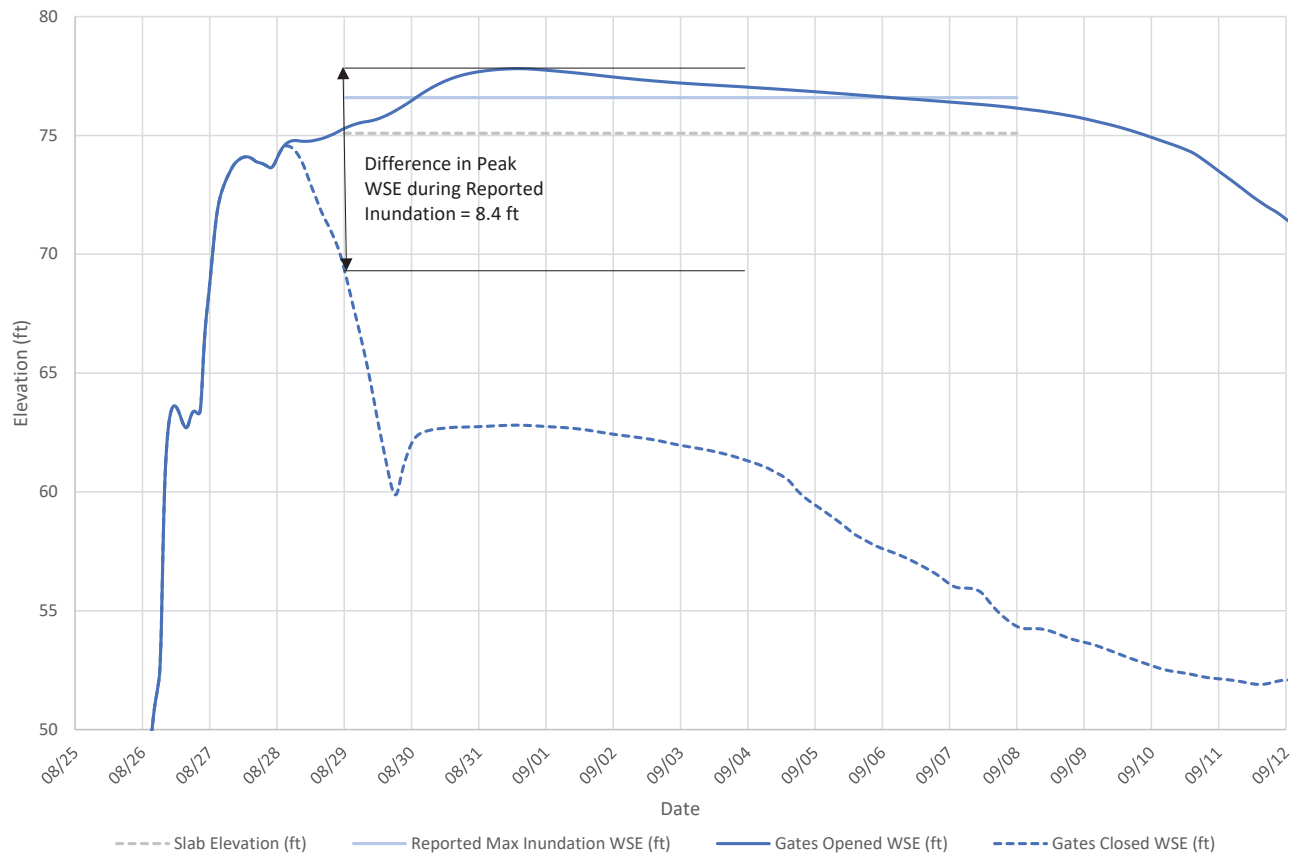


Figure 6-5G: Elevation Hydrograph for #7 Silverman

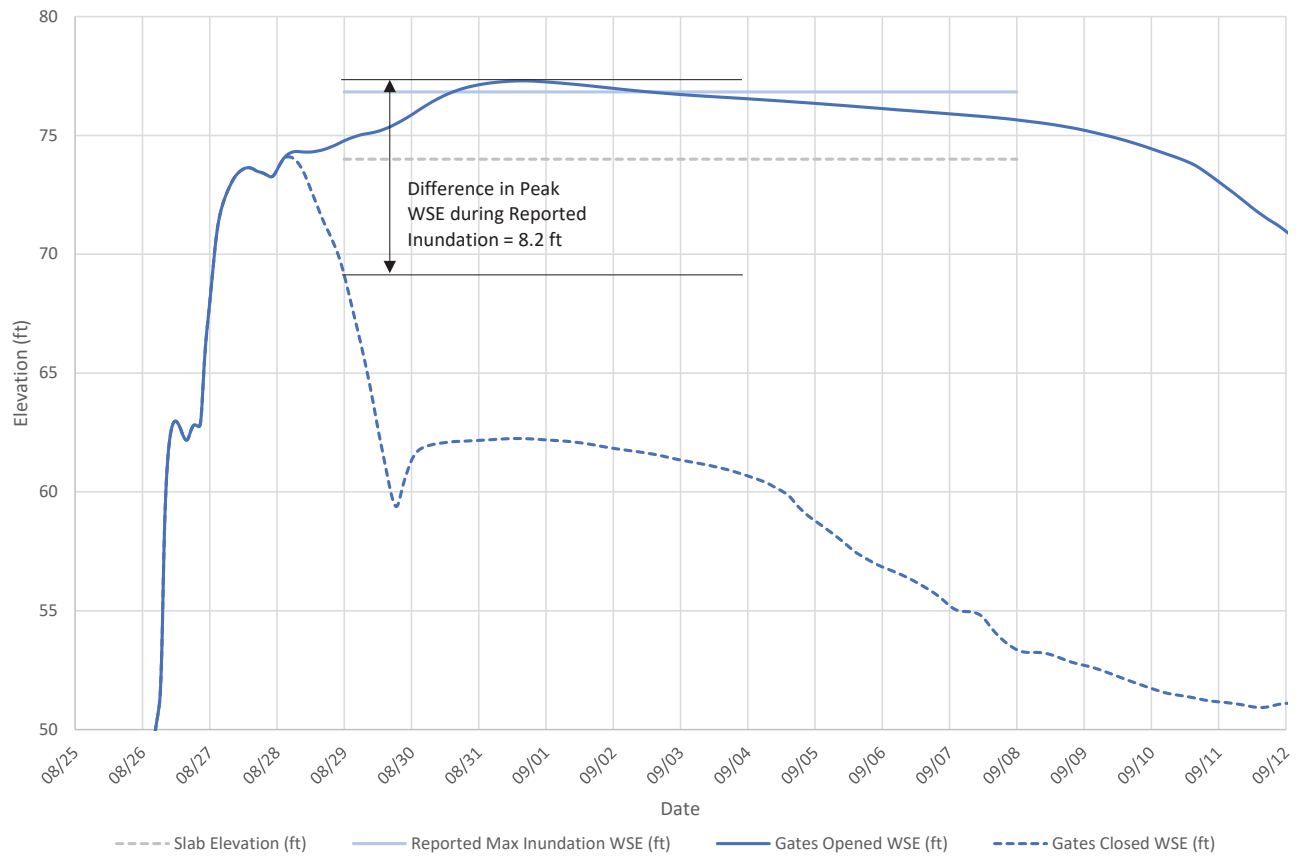


Figure 6-5H: Elevation Hydrograph for #8 Godejord

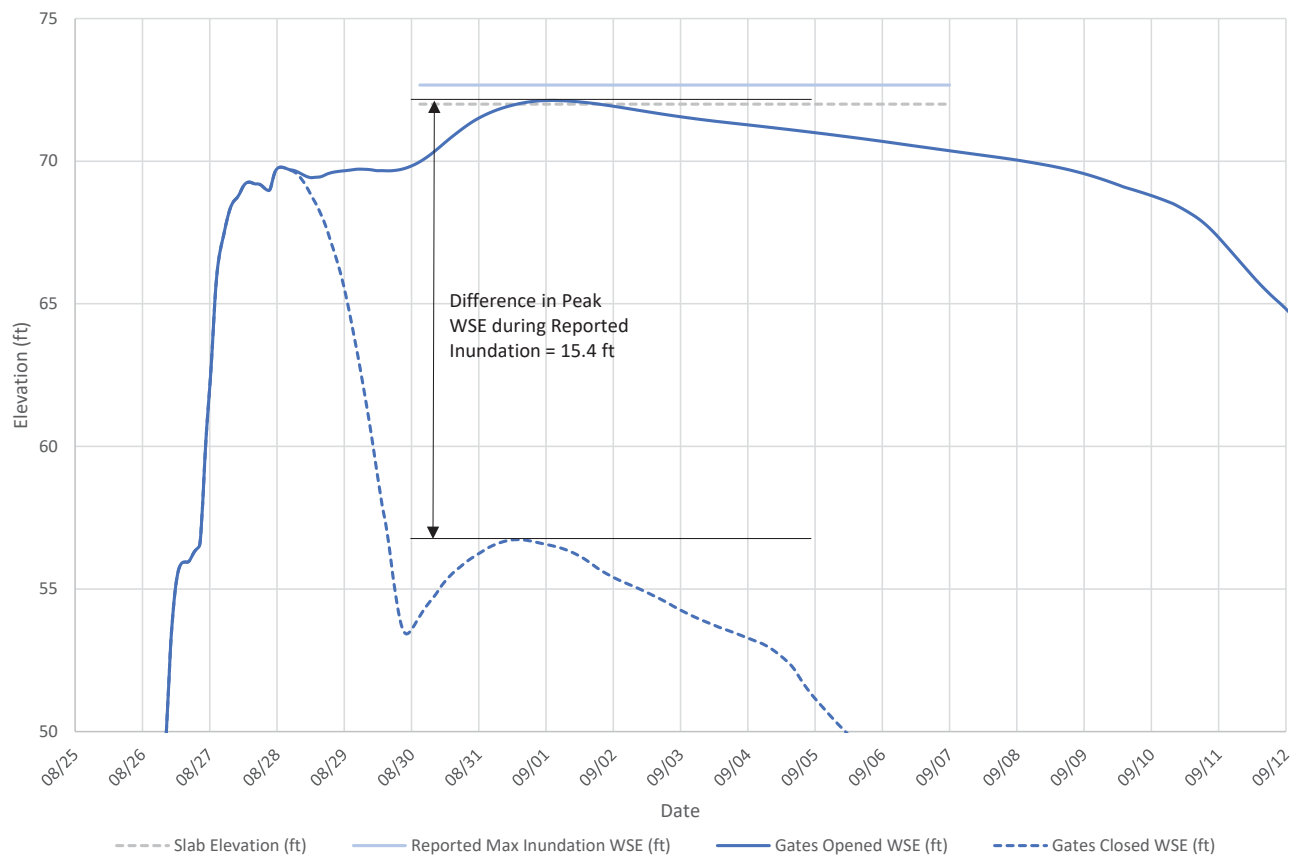


Figure 6-5I: Elevation Hydrograph for #9 Cutts

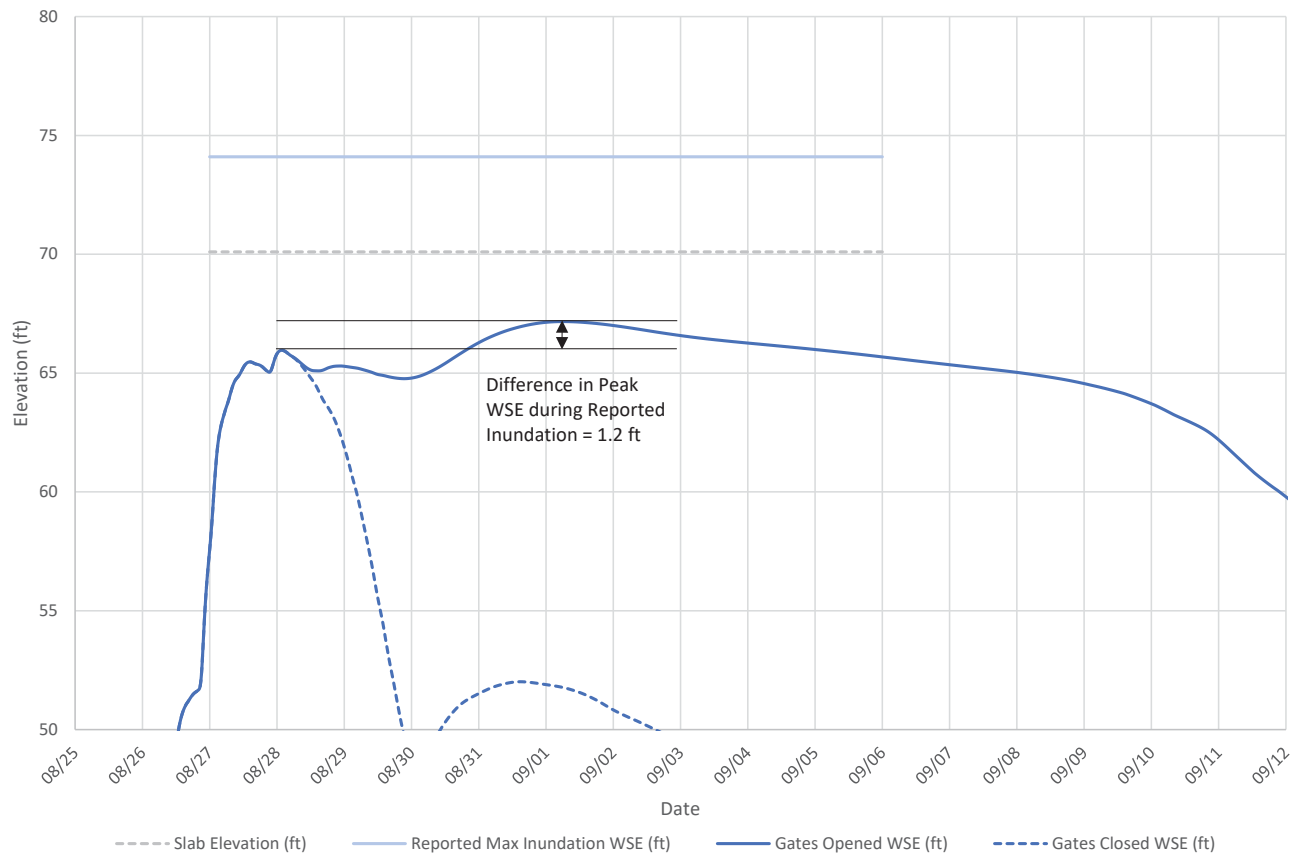


Figure 6-5J: Elevation Hydrograph for #10 Beyoglu

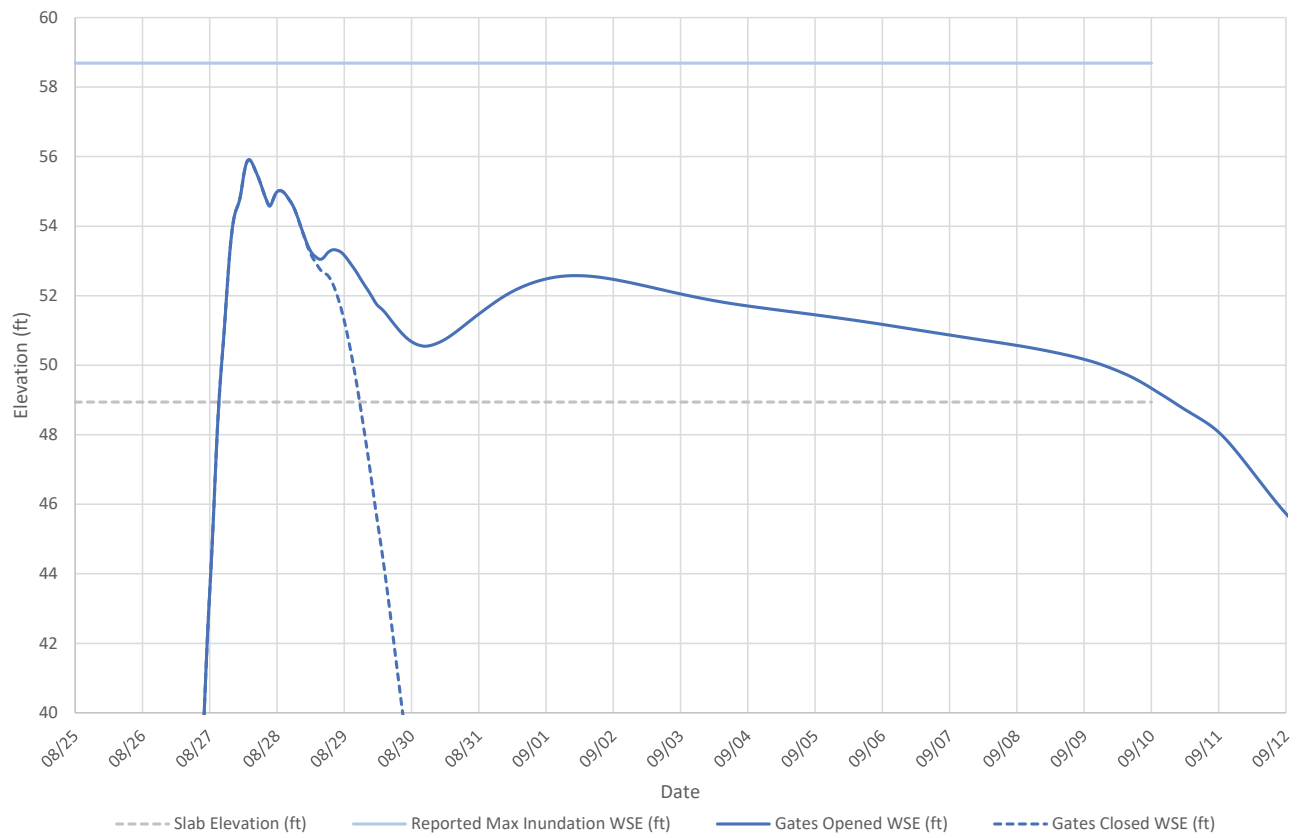


Figure 6-5K: Elevation Hydrograph for #11 Azar

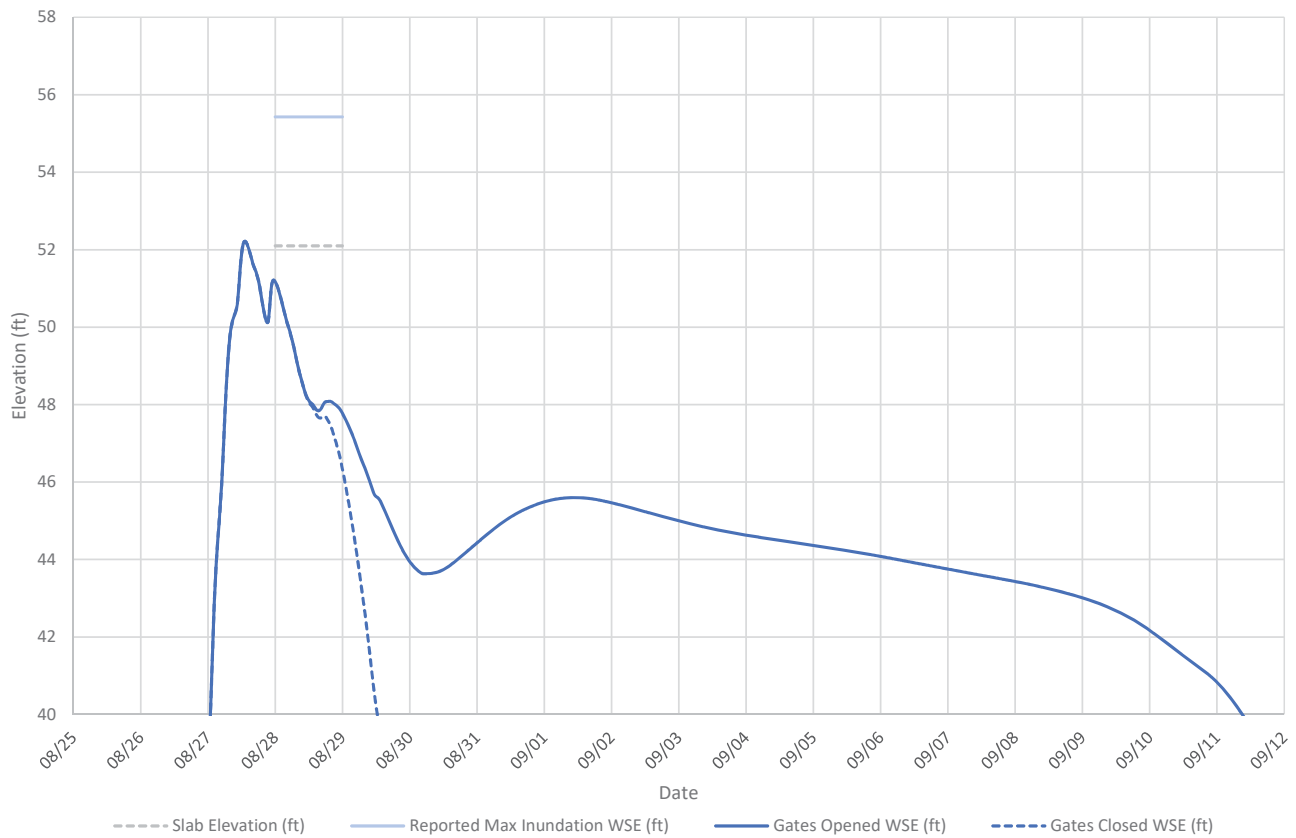


Figure 6-5L: Elevation Hydrograph for #12 Stahl

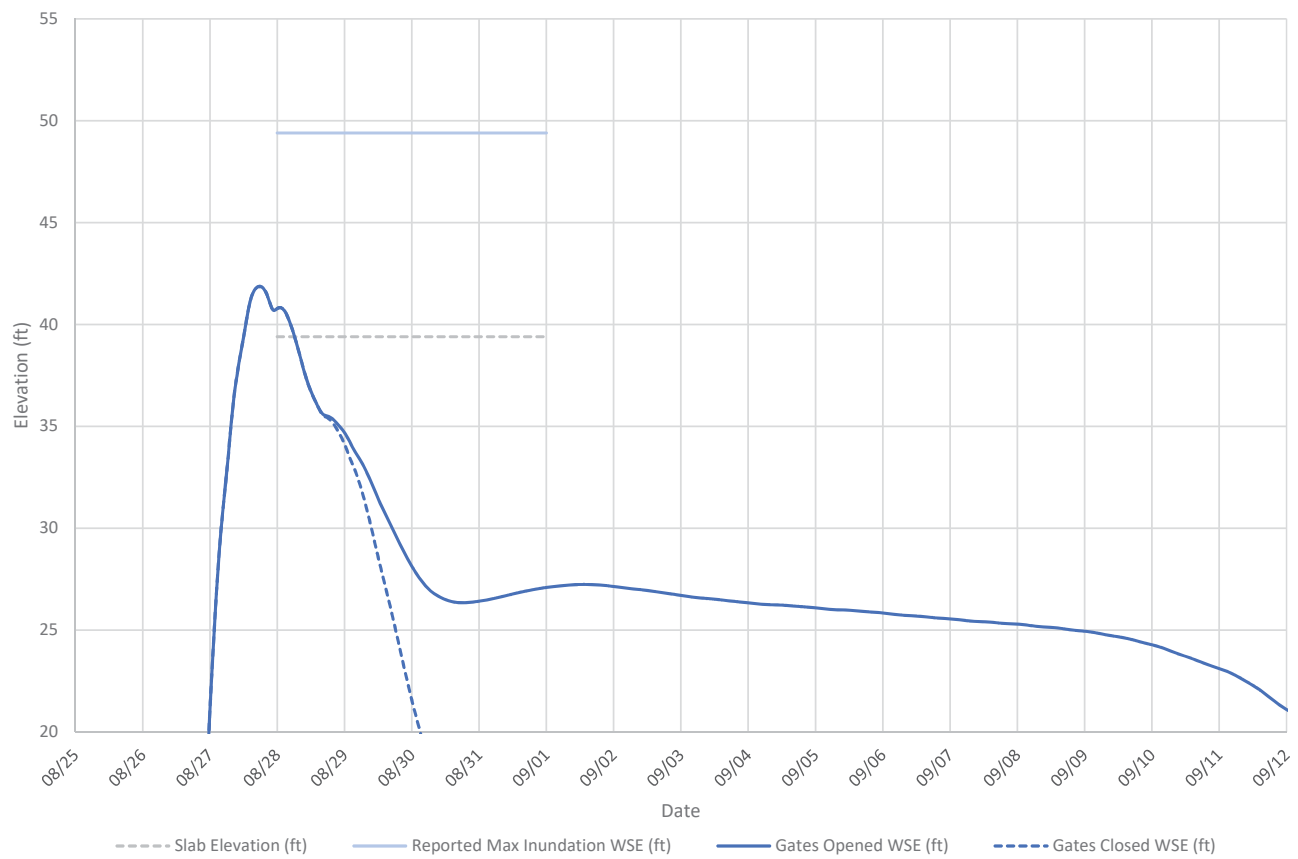


Figure 6-5M: Elevation Hydrograph for #13 Welling

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SECTION 7

INITIAL OPINIONS ON PROPERTY INUNDATION

7.1 Opinion 1: Effect of Opening the Gates

The gates opened scenario based on the actual gate openings in general accordance with the 2012 WCM was compared to the gates closed scenario. Utilizing estimated inflow rates into the reservoirs, calculated storage volumes behind the dams, and calculated outflow rates (from either the gate openings or the dam flanking flows), the pool levels and flanking flows were investigated. Hydraulic modeling results comparing the gates opened and gates closed model scenarios are presented in **Table 6-4** and **Figure 6-5**. The opinions presented below were formulated using these model results, deposition testimony, and the additional information presented in this report.

In my opinion, the USACE's decision to open the gates in general accordance with the 2012 WCM significantly increased downstream flows within Buffalo Bayou during Hurricane Harvey. Based on the hydraulic model results and deposition testimony, the 13 downstream test properties were adversely impacted as a result of the USACE's decision to implement the induced surcharge operation schedule according to the 2012 WCM.

The resulting impact was to cause additional inundation to downstream properties along Buffalo Bayou, including the 13 downstream test properties.

7.2 Opinion 2: Inundation of Properties in Zone 1

7.2.1 Property 1 – Milton

The property located at 850 Silvergate Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 4.33 ft of water above the building slab elevation of 78.61 ft beginning approximately 3:00 am on 28 August 2017 and lasting until approximately 10 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.78 ft. The gates closed model scenario results in a modeled water surface elevation of 79.42 ft.

The plaintiff reported that inundation of the property did not occur until after 3:00 am on 28 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.81 ft (9.7 in) prior to gates opening; however, this is within the model's uncertainty for this location. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. **In considering the plaintiff's testimony and the results of the model, it is my opinion that the plaintiff's reported inundation depth and associated damage to the property**

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was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.

7.2.2 Property 2 – Shipos

The property located at 931 Bayou Parkway was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 1.25 ft of water above the building slab elevation of 80.90 ft beginning on or about 29 August 2017 and lasting until approximately 4 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.53 ft. The gates closed model scenario results in a modeled water surface elevation of 79.09 ft.

The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the modeling, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.2.3 Property 3 – Memorial SMC

The property located at 777 S. Mayde Creek Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was initially inundated beginning late on the night of 27 August 2017 with approximately 6 to 8 inches of water. A maximum inundation depth of 5.5 to 6.0 ft of water above the building slab elevations that range from 77.0 ft to 77.9 ft, with inundation lasting until 11 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.48 ft. The gates closed model scenario results in a modeled water surface elevation of 79.01 ft.

The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 12 to 20 inches prior to gates opening; however, this is within the model's uncertainty for this location. Based on the plaintiff's testimony regarding observed inundation depth, it is reasonable that the property would have had a lower inundation depth prior to the gates opening, and the model results are reasonably consistent with observed conditions. In addition to the model results showing a distinct rise in the water surface elevation after the gates were opened, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. **It is my opinion that a substantial increase in inundation depth (on the order of 3.5 to 5.5 ft) above the plaintiff's observed inundation depth on the far northeast corner of the property late in the evening of 27 August 2017, and that a substantial increase in duration of inundation (on the**

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order of 13 days) from a modeled duration of less than one day under the gates closed scenario, was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM, and that such additional inundation and associated damage to the property would not have occurred if the gates had remained closed.

7.2.4 Property 4 – Good Resources

The property located at 760 Memorial Mews Street #4 was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 3.33 ft of water above the building slab elevation of 78.50 ft beginning approximately 11:19 am on 28 August 2017 and lasting until approximately 10 September 2017. The gates opened model scenario results indicates a modeled water surface elevation of 82.43 ft. The gates closed model scenario indicates a modeled water surface elevation of 78.92 ft.

The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario with approximately 3.5 ft of inundation, consistent with the testimony. The plaintiff reported that inundation of the property did not occur until after 11:00 am on 28 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.42 ft (5.0 in) prior to gates opening; however, this is within the model's uncertainty for this location. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's property would not have been inundated under a gates closed scenario and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.3 Opinion 3: Inundation of Properties in Zone 2

7.3.1 Property 5 – Aldred

The property located at 835 Thornvine Lane was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 1.5 ft of water above the building slab elevation of 80.20 ft beginning on approximately 30 August 2017 and lasting until approximately 2 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.13 ft. The gates closed model scenario results in a modeled water surface elevation of 78.79 ft.

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The 1D HEC-RAS model results show the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.3.2 Property 6 – Hollis

The property located at 14914 River Forest Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 3.75 ft of water above the building slab elevation of 76.50 ft beginning on approximately 28 August 2017 and lasting until approximately 9 September 2017. The gates opened model scenario results in a modeled water surface elevation of 80.80 ft. The gates closed model scenario results in a modeled water surface elevation of 77.38 ft.

The plaintiff reported that inundation of the property did not occur until 28 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.88 ft (10.6 in) prior to gates opening; however, this is within the model's uncertainty for this location. Based on the plaintiff's testimony regarding observed inundation depth, it is reasonable that the property would not have flooded prior to the gates opening, and the model results are reasonably consistent with observed conditions. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.4 Opinion 4: Inundation of Properties in Zone 3

7.4.1 Property 7 – Silverman

The property located at 12515 Westerley Lane was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 1.5 ft of water above the building slab elevation of 75.09 ft beginning on approximately 29 August 2017 and lasting until approximately 8 September 2017. The gates opened model scenario results in a modeled water surface elevation of 77.81 ft. The gates closed model scenario results in a modeled water surface elevation of 74.56 ft.

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The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.4.2 Property 8 – Godejord

The property located at 14334 Heatherfield Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 2.83 ft of water above the building slab elevation of 74.00 ft beginning on approximately 29 August 2017 and lasting until approximately 8 September 2017. The gates opened model scenario results in a modeled water surface elevation of 77.29 ft. The gates closed model scenario results in a modeled water surface elevation of 74.10 ft.

The plaintiff reported that inundation of the property did not occur until 29 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.10 ft (1.2 in) prior to gates opening; however, this is within the model's uncertainty for this location. Based on the plaintiff's testimony regarding observed inundation depth, it is reasonable that the property would not have flooded prior to the gates opening, and the model results are consistent with observed conditions. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.5 Opinion 5: Inundation of Properties in Zone 4

7.5.1 Property 9 – Cutts

The property located at 311 Blue Willow Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 0.67 ft of water above the building slab elevation of 72.00 ft beginning around 3:00 am on 30 August 2017 and lasting until approximately 7 September 2017. The gates opened model scenario results in a modeled water surface elevation of 72.13 ft. The gates closed model scenario results in a modeled water surface elevation of 69.79 ft.

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The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed despite the model results over estimating the WSE at the property.**

7.6 Opinion 6: Inundation of Properties in Zone 5

7.6.1 Property 10 – Beyoglu

The property located at 107 Warrenton Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 4.0 ft of water above the building slab elevation of 70.10 ft beginning on 27 August 2017 with approximately 2.0 ft of inundation and rising to 4.0 ft on 29 August 2017 and lasting until approximately 5 September 2017. The gates opened model scenario results in a modeled water surface elevation of 67.17 ft. The gates closed model scenario results in a modeled water surface elevation of 65.96 ft.

The plaintiff reported that inundation of the property occurred on 27 August 2017, which was before the gates were opened under the induced surcharge protocol, but this inundation depth increased by an additional 2.0 ft on 29 August 2017, after the gates were opened. The 1D HEC-RAS model indicates a water surface elevation under both scenarios below the reported slab elevation. At this distance downstream from the reservoirs along Buffalo Bayou, the model is consistently under predicting the observed water surface elevations. However, the model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model results of WSE after this time indicates a peak difference in WSE between the two scenarios of 1.2 ft. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and timing is attributable to the difference in WSE between the two scenarios after the reported start of inundation; as result, the inundation of and associated damage to the property is attributed to the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM despite the model results under estimating the WSE at the property.**

7.7 Opinion 7: Inundation of Properties in Zone 6

7.7.1 Property 11 – Azar

The property located at 3 Magnolia Bend Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony. The plaintiff

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testified that inundation of the property began on 25 August 2017 but was limited to the garage until 28 August 2017 when the entire first floor of the property was inundated. The plaintiff testified that the maximum inundation on the property was up to 9.75 ft (i.e., 117 inches) of water above the building slab elevation of 48.94 ft and lasting until approximately 8 September 2017.

At this location downstream of the reservoirs, the gates opened and gates closed model scenarios indicate very similar peak flow rates within Buffalo Bayou and modeled water surface elevations of approximately 55.91 ft. However, the model shows a very distinct difference in the sustained flow rate within Buffalo Bayou when comparing the gates opened and gates closed scenarios. The modeled gates opened flow hydrograph at this location matches the recorded gauge flow hydrograph very well. When the modeled gates closed flow hydrograph is compared to the recorded flows at the Piney Point gauge (see **Figure B-9** for hydrographs at USGS 08073700 in **Appendix B**), a distinct decrease in the sustained flow rate is very pronounced. The gates closed flow rate drops from nearly 11,000 cfs to approximately 2,000 cfs in less than two days. The gates opened hydrograph shows the prolonged and sustained flow rates at elevated flood levels for a much longer duration when compared to the gates closed scenario.

In considering the plaintiff testimony and general trends of the modeling, **it is my opinion that a substantial increase in duration of inundation (on the order of 12 days) from a modeled duration of approximately 48 hours under the gates closed scenario, was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM, and that such additional inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.7.2 Property 12 – Stahl

The property located at 265 Chimney Rock Road was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony. The plaintiff testified that the property was inundated with up to 3.33 ft of water above the building slab elevation of 52.10 ft.

Downstream of the Piney Point gauge (USGS 08073700), the 1D HEC-RAS model appears to under estimate the peak flow and water surface elevation as compared to reported values by the USGS gauge. Due to the lack of direct observations of flood inundation by the plaintiff, a thorough calibration of the model at this location was not feasible. Without the support of direct observations of the flood inundation of the property, I am unable to present an informed opinion of the full cause or duration of the inundation attributed to the induced surcharge releases.

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7.8 **Opinion 8: Inundation of Properties in Zone 7**

7.8.1 **Property 13 – Welling**

The property located at 5731 Logan Lane was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony. In addition, Dutch Lindeburg (2018) testified that inundation of the property began on 28 August 2017, with an observed depth of approximately 3 ft above the first floor slab elevation of 47.40 ft. Mr. Lindeburg's testimony reported an additional 1.5 ft of inundation (with a total depth of approximately 4.5 ft) occurred by 2:00 am 29 August 2017. The 1D HEC-RAS model does not adequately predict the significant flows within the channel at this point; however, the USGS gauge 08074000 Buffalo Bayou at Houston is in close proximity to the property to provide recorded flow data.

In considering the plaintiff testimony and general trends of the USGS gauge, **it is my opinion that the observed increase in inundation on 29 August 2017 could reasonably be the result of the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM on 28 August 2017.**

7.9 **Summary of Conclusions**

During and after Hurricane Harvey, Addicks and Barker Reservoirs were operated in a manner that caused downstream flooding as a result of induced surcharge operations. Induced surcharge operations had the effect of mitigating upstream inundation, to the detriment of downstream properties, which experienced inundation that otherwise would not have occurred. At the time of Hurricane Harvey, USACE knew – with specificity to streets, blocks, or intersections – the downstream impact of its decision to release water from Addicks and Barker Reservoirs pursuant to the 2012 WCM's induced surcharge procedures. As explained in this Report, action undertaken by USACE to open the Addicks and Barker gates was the decision that caused the downstream test properties to be inundated, and those properties would not have been inundated, and/or would not have been inundated to the extent experienced during and after Hurricane Harvey, but for the induced surcharge release⁵. This decision to abandon from the long-standing policy of protecting downstream properties increased the duration and depth of inundation.

⁵ No conclusions can be reached to a reasonable degree of scientific and engineering probability with respect to downstream test property #12 Stahl.

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SECTION 8

INITIAL OPINION ON ADDICKS AND BARKER SPILLWAY AND OUTLET WORKS

Geosyntec participated in a one-day duration site visit to the Addicks and Barker Reservoirs hosted by representatives of USACE. At the time of the site visit, work was progressing on the new outlet structures at both dam sites. The purpose of the site visit was to observe first-hand the condition of the dams and specifically the current conditions at the north end of Addicks Dam. This area was subjected to local overtopping and flood waters flowed around the end of the reservoir containment system. Prior to and after the site visit, Geosyntec reviewed numerous documents related to: (i) historical concerns published by USACE regarding safety of the two dams and outlet works, (ii) historical rehabilitation measures for the dams and outlet works, (iii) current rehabilitation efforts at the outlet works; (iv) the 1962 RRM and 2012 WCM; and (v) performance of the dams during Hurricane Harvey. Based on review of these documents, Geosyntec has developed the following observations:

- Hurricane Harvey resulted in pool levels of 109.09 ft (Addicks) and 101.56 ft (Barker). These pool levels were well within the design conditions of the reservoirs.
- The 2012 WCM allowed the gates to be opened resulting in significant releases of flood waters to Buffalo Bayou.
- The actions taken by USACE followed the 2012 WCM in that the gates were opened when pool levels in the reservoir reached elevation 101.0 ft (Addicks) and 95.7 ft (Barker). Furthermore, Geosyntec concurs that the USACE response to inspections and assessments during Hurricane Harvey were appropriate.

These observations notwithstanding, the operations of the outlet works during Hurricane Harvey in accordance with the 2012 WCM had significant consequences to Buffalo Bayou that have been well documented in other sections of this Report. Based on review of the history of Addicks and Barker flood control systems (i.e., levees and outlet works), Geosyntec provides the following opinions:

- When water levels in the Addicks Reservoir exceeded approximately elevation 108.0 ft, water was “naturally” released (or flanked) around the north end of Addicks Dam. By USACE assessment... *“This release was observed to be limited to low velocity sheet flows.”*
- The current condition of the dam at the north end of the Addicks Reservoir includes levees of limited height that are protected from overtopping by roller-compacted concrete. The levee in this area appeared to be undamaged by the overtopping during Hurricane Harvey. These protected levees could have sustained significantly higher floodwaters than imposed

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during Hurricane Harvey, as the velocity of flow would likely remain quite low, due to the local topography.

- In response to dam safety concerns identified by USACE, rehabilitation efforts were completed by USACE after publication of the 1962 RRM to improve performance of the outlet works (i.e., mitigate potential for excessive seepage and piping). The previous (i.e., pre-Hurricane Harvey) maximum pool of record (i.e., elevation 102.65 ft (Addicks) and 95.2 ft (Barker)) were reached in 2016 and provided a full-scale demonstration of the effectiveness of rehabilitation activities at the outlet works completed since imposition of the 2012 WCM. Therefore, it was not necessary from a dam safety perspective to open the gates. In fact, post-Hurricane Harvey assessment has shown that primarily due to the natural flanking release at the north end of the Addicks Reservoir, there was little impact on impounded flood water elevation when the gates were opened.
- It is Geosyntec's opinion that had the gates not been opened during Hurricane Harvey, the maximum pool levels would not have changed significantly and there would have been no significant decrease in dam safety due to levee instability and/or seepage and piping.

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SECTION 9

PRELIMINARY OPINIONS REGARDING DEFENSES THAT MAY BE RAISED

9.1 Introduction

Geosyntec has been informed that USACE may choose to advance legal theories or defenses predicated on a hypothetical scenario assuming that the reservoirs were never constructed. Geosyntec expresses no opinion regarding the legal validity of any such theories or defenses. To evaluate such a hypothetical scenario, we investigated reasonable stormwater management and infrastructure improvements that would be expected from the time the dams were built in the 1940s until the time of Hurricane Harvey in 2017. In addition to these infrastructure improvements, it is reasonable to assume that the land development regulations, land use, stream buffers, and other development over the roughly 70 years from the time the dams were built to 2017 would have varied considerably. These variations would have been driven by Federal regulations, local ordinances, and land development pressures.

9.2 Flood Protection Measures

After the devastating floods of 1929 and 1935, the State of Texas created the Harris County Flood Control District (HCFCD) in 1937 for the purpose of “the control, storing, preservation, and distribution of the storm and flood waters, and the waters of the rivers and streams in Harris County and their tributaries, for domestic, municipal, flood control, irrigation, and other useful purposes, the reclamation and drainage of the overflow land of Harris County, the conservation of forests, and to aid in the protection of navigation on the navigable waters by regulating the flood and storm waters that flow into said navigable streams” (*FEMA FIS, Jan 6, 2017*) *The Flood Insurance Study (FIS) for Harris County, TX and Incorporate Areas dated January 6, 2017*.

The FIS states that “since that time (i.e. 1937), there have been many significant projects to reduce flood damage in Harris County. Many of these projects are the results of partnerships between the HCFCD and the U.S. Army Corps of Engineers (USACE), Federal Emergency Management Agency (FEMA), and others.” It is reasonable to assume that if the two dams were not constructed, the HCFCD and their partners would have continued their efforts to evaluate and implement a range of alternative flood mitigation practices and flood protection measures to address land development pressure.

Reasonable alternatives to the dams which would have been required to maintain a level of land development along Buffalo Bayou are expected to include:

- channel modifications such as widening, straightening, and/or lining the bayous to improve downstream conveyance;

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- additional levees around property to protect against extreme flood events within the bayous;
- improved bridge standards in terms of bridge elevation, design flows, and structural support;
- the use of detention and/or retention ponds to decrease peak flow rates and/or runoff volumes;
- residential development changes in downstream properties with respect to density, impervious cover, and proximity to bayous;
- additional diversion channels, local conveyance systems, and bypass channels to allow for multiple flow paths within the built environment;
- stormwater runoff and drainage plans for an integrated approach to the improved management and control of runoff;
- regulatory land development code changes related to building location, minimum elevation of structures or homes above the base flood elevation, and local drainage controls; and
- revised regulatory Flood Insurance Studies prepared by FEMA to map and delineate flood risk zones.

The central and common element influencing the implementation of flood mitigation practices and flood protection measures within the area of interest of this Report is the flooding along Buffalo Bayou. The purpose of each practice or measure is to reduce the risk of damage or loss of life, as was central to the original formation of the HCFCD. This idea was reinforced when Congress created the National Flood Insurance Program (NFIP) in 1968 to reduce flood losses and disaster relief cost by guiding future development away from flood hazard areas where practicable, requiring flood resistant design and construction, and transferring costs of losses to floodplain occupants through flood insurance premiums.

As is noted on the HCFCD website (HCFCD.org), examples of flood mitigation include elevating homes and business above the base flood, relocating homes out of the floodplain, and minimizing the vulnerability to flood damage through both structural and nonstructural means. An important element of the NFIP is the adoption of ordinance and development codes at the local level that protect structures. One such example is the City of Houston's requirement to construct buildings with a finish floor at least two feet higher than the 500-year floodplain. This reinforces that if the two dams were not constructed in the 1940s, alternative flood mitigation practices and flood protection measures would have been evaluated, which would have included the establishment of ordinances and development codes to protect structures.

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9.3 Deposition Testimony

Several of the testimonies given by the range of professions with knowledge of the flood control and flood protection systems in the Houston area, express agreement that alternative measures would likely have been evaluated and implemented if the two dams were not constructed.

We agree with **Jeff Lindner** (chief meteorologist, HCFCD) who stated in the deposition testimony that had no dams been built, “there definitely probably would have been some engineering studies” performed to evaluate the best flood control projects. Mr. Lindner stated that if Addicks and Barker Reservoirs had not been constructed, the area along Buffalo Bayou would be uninhabitable, assuming if no other measures were implemented. From the deposition, Mr. Lindner concurred that reasonable flood risk management alternatives include:

- concrete lining of the bayou;
- widening, deepening, removing obstacles and straightening of the bayous;
- levees;
- diversion channels;
- storm drains and pipes constructed by municipalities;
- local codes for developers to build flood control systems;
- zoning to ensure that future development is constructed at an elevation that would potentially remove structures from various floodplains as an alternative for flood risk management; and
- not developing land in areas that are prone to inundation is an alternative for flood risk management.

We agree with **Jamila Johnson** (flood control manager, City of Houston) who stated in the deposition testimony that if no dams were constructed, the floodplain would be different. She indicated that the City of Houston would still require buildings to be built two feet higher than the 500-year floodplain. When compared to current flood protection elevations, Ms. Johnson indicated that higher flood protection elevations would be required if no dam was constructed, or else there would be no building at all along Buffalo Bayou. We concur that if the dams were not constructed, the floodplain would likely be higher and would require buildings to be raised to a higher elevation to provide the same two feet of freeboard above the 500-year floodplain.

In the deposition testimony, **Braxton Coles** (drainage maintenance, City of Houston) expressed his opinion that the damage was not caused by the City’s storm drain system. Based on his experience, rainwater typically drains in Houston within one day. After Harvey, his crews inspected the system and found the drainage system was in good working order, and thus it is his opinion that the water staying for a week later was not caused by the City’s system.

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9.4 Flood Risk Mapping

Through the National Flood Insurance Program (NFIP), FEMA is the recognized source for flood risk information. Residents can readily research and understand their flood risk with online mapping tools and obtaining readily available information such as the FIS, Water Surface Profiles, and FEMA Flood Insurance Rate Map (FIRM). These collectively provide information to homeowners making informed decisions. The current FIS for Harris County, TX and Incorporate Areas is dated 6 January 2017, prior to Hurricane Harvey.

Section 2.4 “Flood Protection Measures” of the FIS states that the dams help protect the City of Houston from floodwaters. Water is stored only for flood control and is released when flooding is no longer a danger. When significant runoff producing storms occur, the gates are closed and remain closed until the peak at Piney Point passes and the discharge drops below 2,000 cfs. Reservoir releases will not be made any time the 2,000 cfs limit is exceeded (considered a non-damaging discharge) in Buffalo Bayou at Piney Point.

9.5 Opinions

We believe based on reasonable probability and engineering judgement that alternative flood protection measures to the Addicks and Barker Dams would have been considered and built over the past 70 years of development, if the two dams were not constructed. These alternatives, which would have included stormwater management, flood protection and mitigation, and improved conveyance, would have likely provided similar or better protection to the 13 downstream test properties when compared to the performance of the Addicks and Barker Dams during Hurricane Harvey.

- It is reasonable to assume that other alternative flood protection measures would have been implemented in place of the reservoirs if they were not constructed. The alternative measures would have included structural practices and policies or ordinances to limit where development occurred and how structures are constructed.
- Alternative structural measures and practices would have likely included:
 - improvement of channel conveyance by lining the bayous with concrete or armoring;
 - improvement of channel conveyance by making the bayou channel wider, deeper, straighter, or by removing obstructions;
 - construction of levees to limit inundation;
 - construction of diversion channels;
 - expansion of culverts, trunk storm sewers, drains, and local stormwater management systems; and

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- control of stormwater runoff from development by the construction of detention basins as part of private land development to offset potential increases to flood flows.
- Alternative policies and ordinances that would have been implemented are likely to have included:
 - local codes to require developers to construct stormwater management systems, such as detention basins to control runoff from development;
 - local codes to require developers to evaluate flood risk and construct appropriate flood control or management systems to protect their proposed developments;
 - local codes to protect structures from damage, such as raising the building or critical facilities two feet above the 500-year floodplain or requiring the use of flood proof material; and
 - local codes to restrict development in the floodplain and require mitigation measures if the floodplain is impacted by development. An example includes the requirement that proposed fill in the floodplain must be offset by appropriate compensating volume.

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SECTION 10

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Appendix A1

Matt Bardol Background

Including:

- C.V.
- List of Publications Authored in the Previous 10 Years
- List of Cases in Which he Testified in Trial or Deposition for the Previous 4 Years
- Fee Schedule

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Appendix A2

Bob Bachus Background

Including:

- C.V.
- List of Publications Authored in the Previous 10 Years
- List of Cases in Which he Testified in Trial or Deposition for the Previous 4 Years
- Fee Schedule

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Appendix B

HEC-HMS and 1D HEC-RAS Model Analyses



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Appendix C

Enhanced 2D HEC-RAS Model Analysis



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Appendix D

Inflow Time Series Analysis



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Attachment 1

FEMA Flood Insurance Study Flood Profiles and Table 3

(source: FEMA, 2017)



IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM ADDICKS AND
BARKER (TEXAS) FLOOD-CONTROL
RESERVOIRS

§
§
§ Sub-Master Docket No. 17-cv-9002L

THIS DOCUMENT RELATES TO:

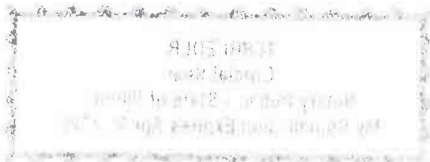
§
§ Judge Loren A. Smith

ALL TEST PROPERTIES

§
§
§

AFFIDAVIT OF MATTHEW BARDOL, P.E., CFM, D.WRE

1. "My name is Matthew Bardol. I am over the age of eighteen, of sound mind, and capable to make this affidavit. The facts stated in this affidavit are true and correct and within my personal knowledge.
2. Attached and incorporated by reference to this Affidavit is a true and correct copy of my report of November 13, 2018, which contains a fair and accurate summary of the opinions I have rendered in this matter, the bases for those opinions, and a fair and accurate summary of my background, education, training, and experience.
3. Subsequent to the completion of my report, I received and reviewed the November 5, 2018 Expert Report of Dr. R. Nairn (designated as 12879.101.R1.Rev0) served in the Upstream Sub-Master Docket. Specifically, I reviewed the "Gates Closed Run" generally described by Dr. Nairn in Section 5.2.3 of his Upstream Report, at pages 159-160, as well as the Telemac modeling data for the "Gates Closed Run", and an accompanying spreadsheet labeled as BAIRD0000385. A copy of that spreadsheet is attached hereto and incorporated by reference. The spreadsheet describes results of the modeling for the "Gates Closed Run" for the thirteen Downstream Test Properties as follows:




#	Property Identification			Elevation Information (Feet)					Gates Closed Run				
	Plaintiff	Address	UP/DOWN	Lowest Grade	Garage Elevation	Lowest Adjacent Grade	First Finished Floor	Second Finished Floor	Max Depth in First Finished Floor (feet)	Max Depth in First Finished Floor (Inches)	Flooding duration in First Finished Floor	Flooding duration in First Finished Floor (hr)	Number of flooding times of first finished
1	Aldred, Val & Linda	835 Thornvine Lane	DOWN	78.3	80.1	79.4	80.6	N/A	0.4	4.6	0 day, 10 hr	10	1
2	Good Resources, LLC	760 Memorial Mews St. #4	DOWN	75.1	-	77.8	78.5	87.4	No Flooding above Level 1	-	-	-	0
3	SMC Investment	777 S. Mayde Creek Drive	DOWN	72.4	78.2	73.5	77.2	77.3	No Flooding above Level 1	-	-	-	0
4	Milton, Arnold	850 Silvergate Drive	DOWN	76.3	78.6	78.0	78.5	78.6	No Flooding above Level 1	-	-	-	0
5	Shipos, Jennifer	931 Bayou Parkway	DOWN	78.2	80.5	80.2	80.9	-	No Flooding above Level 1	-	-	-	0
6	Hollis, Wayne	14314 River Forest	DOWN	74.5	76.7	75.2	76.6	-	No Flooding above Level 1	-	-	-	0
7	Silverman, Peter	12515 Westerley Lane	DOWN	73.4	75.2	74.4	75.0	-	No Flooding above Level 1	-	-	-	0
8	Godejard, Steven	16334 Hawthornfield	DOWN	68.5	73.5	72.8	73.7	-	No Flooding above Level 1	-	-	-	0
9	Cutts, Paul	311 Blue Willow Drive	DOWN	68.6	71.1	69.9	71.7	-	No Flooding above Level 1	-	-	-	0
10	Ho, Becky		DOWN	69.2									
11	Beyoglu, Mahmut	107 Warrenton Drive	DOWN	63.6	64.6	63.6	65.4	-	10	12.6	0 day, 21 hr	21	2
12	App, Philip	3 Magnolia Bend	DOWN	43.6	48.1	44.6	48.9	-	6.5	102.3	2 day, 5 hr	53	1
13	Stahl, Timothy	265 Chimney Rock Road	DOWN	55.0	55.4	55.2	52.1	55.9	2.8	33.6	0 day, 17 hr	17	3
14	Welling, Sharon	5731 Logan Lane	DOWN	36.1	46.6	37.3	36.0	47.4	8.6	105.5	2 day, 2 hr	50	1

The results of Dr. Nairn's modeling for the "Gates Closed Run" is consistent with and further supports the results of the Gates Closed Enhanced 2D HEC-RAS Model described in my November 13, 2018 Report. Specifically, Dr. Nairn's "Gates Closed Run" reflects that for the Cutts, Godejard, Good Resources, LLC, Hollis, Milton, Silverman, and Shipos properties, those properties would not have flooded but for the dam releases. For the Aldred, Beyoglu, Azar, and Welling Downstream Test Properties, Dr. Nairn's "Gates Closed Run" reflects that those properties sustained increased depth and/or duration of flooding due to the releases from the Addicks and Barker reservoirs, consistent with the results of the Gates Closed Enhanced 2D HEC-RAS Model described in my November 13, 2018 Report. The Aldred, Beyoglu, Azar, and Welling Downstream Test Properties would not have flooded to the depth and/or duration experienced but for the dam releases.

FURTHER AFFIANT SAYETH NOT."


MATTHEW BARDOL

SWORN TO AND SUBSCRIBED before me this 12 day of June, 2019.


NOTARY PUBLIC, STATE OF



Property Identification				Elevation Information (feet)					Gates Closed Run				
	Plaintiff	Address	UP/DOWN	Lowest Grade	Garage Elevation	Lowest Adjacent Grade	First Finished Floor	Second Finished Floor	Max Depth in First Finished Floor (feet)	Max Depth in First Finished Floor (inches)	Flooding duration in First Finished Floor	Flooding duration in First Finished Floor (hr)	Number of flooding times of first finished floor
1	Lakes on Eldridge		UP	106.3	-	108.4	108.9	-	1.1	13.7	9 day, 11 hr	227	1
2	Wind, Kurt & Jean		UP	106.9	108.6	108.2	109.2	109.3	0.9	10.5	6 day, 14 hr	158	1
3	Mitchell, Stewart	20323 Desert Willow Drive	UP	105.7	108.5	108.0	109.0	-	1.1	12.7	8 day, 14 hr	206	1
4	West Houston Airport Corp.	18000 Groeschke Road	UP	106.6	-	107.5	108.6	-	1.5	17.7	15 day, 11 hr	371	1
5	Mitchell, Mario		UP	119.9	121.5	121.1	121.9	-	1.8	21.3	1 day, 13 hr	37	1
6	Burnham, Elizabeth	15626 Four Season Drive	UP	102.6	105.0	104.0	105.5	-	4.5	54.5	17 day, 19 hr	427	1
7	Sidhu, Kulwant	16111 Aspenglenn Drive, Unit 603, Building F	UP	105.1	-	106.3	107.1	116.7	3.0	35.7	17 day, 10 hr	418	1
8	Turney, Robert	15910 Red Willow Drive	UP	101.7	104.2	103.8	104.7	-	5.4	65.0	17 day, 18 hr	426	1
9	Holland, Scott	1923 Wingleaf Drive	UP	106.1	107.4	107.2	107.8	-	2.2	26.9	17 day, 7 hr	415	1
10	Popovici, Catherine	19927 Parsons Green Court	UP	99.6	101.7	100.9	102.2	-	1.7	20.8	16 day, 21 hr	405	1
11	Soares, Elisio		UP	98.7	100.7	100.0	101.1	-	2.9	34.5	17 day, 6 hr	414	1
12	Micu, Christina	6411 Canyon Park Drive	UP	97.7	99.6	98.9	99.8	-	4.2	49.9	17 day, 21 hr	429	1
13	Giron, Juan & Ann	4310 Cassidy Park Lane	UP	99.0	101.0	100.2	101.0	101.5	2.9	35.1	18 day, 9 hr	441	1
14	Banker, Todd & Christina	4614 Kelliwood Manor Lane	UP	97.6	100.2	99.6	100.7	-	3.2	38.6	17 day, 9 hr	417	1
1	Aldred, Val & Linda	835 Thornvine Lane	DOWN	78.9	80.1	79.4	80.6	N/A	0.4	4.6	0 day, 10 hr	10	1
2	Good Resources, LLC	760 Memorial Mews St. #4	DOWN	75.1	-	77.8	78.5	87.4	No Flooding above Level 1	-	-	-	0
3	SMC Investment	777 S. Mayde Creek Drive	DOWN	72.4	78.2	73.5	77.2	77.3	No Flooding above Level 1	-	-	-	0
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7	Silverman, Peter	12515 Westerley Lane	DOWN	73.4	75.2	74.4	75.0	-	No Flooding above Level 1	-	-	-	0
8	Godejard, Strause	14334 Heatherfield	DOWN	68.5	73.5	72.8	73.7	-	No Flooding above Level 1	-	-	-	0
9	Cutts, Paul	311 Blue Willow Drive	DOWN	68.8	71.1	69.9	71.7	-	No Flooding above Level 1	-	-	-	0
10	Ho, Becky		DOWN	69.2									
11	Beyoglu, Mahmut	107 Warrenton Drive	DOWN	63.6	64.8	63.8	65.4	-	1.0	12.6	0 day, 21 hr	21	2
12	Azar, Phillip	3 Magnolia Bend	DOWN	43.6	48.1	44.8	48.9	-	8.5	102.3	2 day, 5 hr	53	1
13	Stahl, Timothy	265 Chimney Rock Road	DOWN	55.0	55.4	55.2	52.1	55.9	2.8	33.6	0 day, 17 hr	17	3
14	Welling, Shawn	5731 Logan Lane	DOWN	36.1	46.8	37.3	36.0	47.4	8.8	105.5	2 day, 2 hr	50	1

INITIAL EXPERT OPINION REPORT

In Re Downstream Addicks and Barker (Texas) Flood-Control Reservoirs

Prepared for:

Downstream Litigation Leadership Team

On Behalf of:

McGehee, Chang, Landgraf
10370 Richmond Ave, Suite 1300
Houston, TX 77042

Mithoff Law Firm
500 Dallas Street, Suite 3450
Houston, TX 77002

Fleming, Nolen & Jez, LLP
2800 Post Oak Blvd, Suite 4000
Houston, TX 77056

Prepared by:

Matt Bardol, P.E.¹, CFM, D.WRE
Robert Bachus, Ph.D., P.E.², D.GE

Geosyntec 
consultants

engineers | scientists | innovators

1420 Kensington Rd, Suite 103
Oak Brook, IL 60523

¹ Professional Engineer licensed in IL, IN, MO, MI, MS, NE, OH, CA, HI

² Professional Engineer licensed in GA, AR, MS, PA, KY, TN, AL, NC

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LIST OF ACRONYMS

1D	one-dimensional
2D	two-dimensional
ac-ft	acre-feet
asl	above sea level
CCR	coal combustion residual
CFM	Certified Floodplain Manager
cfs	cubic feet per second
DEM	digital elevation model
D.GE	Diplomate, Geotechnical Engineering
D.WRE	Diplomate, Water Resources Engineer
EAP	Emergency Action Plan
elev	elevation
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
ft	feet
GOL	government owned land
HCFC	Harris County Flood Control District
HEC	Hydrologic Engineering Center
HMS	Hydrologic Modeling System
hr	hour
in.	inch
NAVD	North American Vertical Datum
NED	National Elevation Dataset
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
P.E.	Professional Engineer
RAS	River Analysis System
RoR	rate of rise
RRM	Reservoir Regulation Manual
TNRIS	Texas Natural Resources Information System
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WCM	Water Control Manual
WSE	water surface elevation

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SECTION 1

INTRODUCTION

1.1 Terms of Reference

I, Matthew Bardol, have been retained by the Downstream Litigation Leadership Team which includes the following three attorneys: (i) McGehee, Chang, Landgraf; (ii) Mithoff Law Firm; and (iii) Fleming, Nolen & Jez, LLP; on behalf of the 13 downstream test property plaintiffs, in connection with In Re Downstream Addicks and Barker (Texas) Flood-Control Reservoirs (case 17-CV-9002L). I have been asked to prepare this Initial Expert Opinion Report (“Report”) to address opinions related to engineering analyses of damages to the 13 downstream test properties and in the above-referenced lawsuit that relate to inundation downstream of Addicks and Barker dams in Houston, Texas.

Geosyntec is compensated for my services related to this matter at a rate of \$305 per hour for investigation, analysis, and report preparation, deposition and trial preparation, and at a rate of \$610 per hour for deposition and court appearances. Compensation for all work related to this matter is in no way tied to the outcome of this litigation.



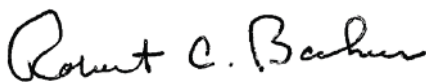
Matt Bardol, P.E., CFM, D.WRE

13 November 2018

Date

I, Robert Bachus, have been retained by the Downstream Litigation Leadership Team which includes the following three attorneys: (i) McGehee, Chang, Landgraf; (ii) Mithoff Law Firm; and (iii) Fleming, Nolen & Jez, LLP; on behalf of the 13 downstream test property plaintiffs, in connection with In Re Downstream Addicks and Barker (Texas) Flood-Control Reservoirs (case 17-CV-9002L). I have been asked to prepare only **SECTION 8** of this Initial Expert Opinion Report (“Report”) to address opinions related to the integrity of the Addicks and Barker Reservoirs including but not limited to the spillways.

Geosyntec is compensated for my services related to this matter at a rate of \$305 per hour for investigation, analysis, and report preparation, deposition and trial preparation, and at a rate of \$610 per hour for deposition and court appearances. Compensation for all work related to this matter is in no way tied to the outcome of this litigation.



Bob Bachus, Ph.D., P.E., D.GE

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Date

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1.2 Professional Background and Qualifications

Matthew Bardol is a Senior Principal in the Oak Brook office of Geosyntec Consultants (Geosyntec) located at 1420 Kensington Road, Suite 103, Oak Brook, IL 60523, and has been with Geosyntec since June 2010. Geosyntec performs consulting services for civil engineering and water resources projects throughout the United States, as well as internationally in Canada, Asia, Australia, and Europe. As a representative of Geosyntec, Mr. Bardol tenders his preliminary opinion responsive to the Scope of Work stated in **Section 1.3** below.

Mr. Bardol obtained his Bachelor of Science degree in Civil Engineering from University of Notre Dame in 1996. In 1999, he obtained his Masters of Science in Environmental Management from Hardin-Simmons University in Abilene, Texas. In 2002, he obtained his Masters of Science in Civil Engineering, with an emphasis in water resources, from the University of Southern California, in Los Angeles, California.

Mr. Bardol has over 22 years of experience in civil and water resources engineering and hydrologic and hydraulic modeling, including models that predict and quantify flood inundation from storm events. He has been involved with and worked on civil and water resources engineering projects throughout his career, with an emphasis on water resources engineering and modeling projects for the past 17 years.

Mr. Bardol is a Professional Environmental Engineer, and he has been a practicing licensed Professional Engineer (P.E.) in the State of California since 2001 and has received reciprocity in multiple states across the U.S. Further details outlining Mr. Bardol's work experience and qualifications to serve as an expert are described in his background information, which is attached to this Report as **Appendix A**.

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Robert Bachus is a Senior Principal in the Kennesaw office of Geosyntec Consultants (Geosyntec) located at 1255 Roberts Blvd., Suite 200, Kennesaw, GA 30144, and has been with Geosyntec since September 1990. As a representative of Geosyntec, Dr. Bachus tenders his preliminary opinion responsive to the Scope of Work stated in **Section 1.3** below.

Dr. Bachus obtained his Bachelor of Science and Masters of Science degrees in Civil Engineering from University of Illinois Chicago Circle in 1974 and 1975, respectively. In 1982, he obtained his Doctor of Philosophy in Geotechnical Engineering from Stanford University.

Dr. Bachus has over 35 years of experience in geotechnical and geoenvironmental engineering, including geotechnical site characterization, settlement and slope stability analysis, and performance monitoring of geotechnical features and earth structures. He previously served as a geotechnical engineering faculty at Georgia Institute of Technology and focused his research on the beneficial re-use of coal combustion residuals (CCRs) and engineering applications for geosynthetic materials, primarily on reinforcing and drainage produce development.

Dr. Bachus is a Professional Engineer, and he has been a practicing licensed Professional Engineer (P.E.) in the State of Georgia since 2003 and has received reciprocity in multiple states across the U.S. Further details outlining Dr. Bachus's work experience and qualifications to serve as an expert are described in his background information, which is attached to this Report as **Appendix A**.

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1.3 Scope of Work

Geosyntec has been asked to review documents and data cited in **Section 1.4** below to assess whether and to what extent the induced surcharge procedures initiated by the U.S. Army Corps of Engineers (USACE) caused inundation of and associated damage to 13 downstream test properties and whether such inundation and associated damage would have been avoided or reduced without the induced surcharge. We have also been asked to offer preliminary analysis of certain defense arguments that may be raised in this litigation. To that extent, we reserve the right to amend our report and/or add opinions and conclusions based on future evidence.

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1.4 Scope and Bases of Opinions

Geosyntec was asked to conduct an evaluation of the hydrologic and hydraulic impacts of Hurricane Harvey in conjunction with the operation of the Addicks and Barker Reservoirs on behalf of the Downstream Litigation Leadership Team. We reviewed the following data and documents in preparation for this Report, and these data and documents serve as the bases of our opinions. We reviewed a two-dimensional (2D) model developed by the USACE using the USACE Hydrologic Engineering Center (HEC) River Analysis System (RAS) software version 5.0.5 (HEC-RAS). We also reviewed the one-dimensional (1D) HEC-RAS model developed by the Harris County Flood Control District (HCFCD) which is the basis of the regulatory Federal Emergency Management Agency (FEMA) effective floodplain models for Harris County. Furthermore, we reviewed Dr. Phil Bedient's (Herman Brown Professor of Engineering at Rice University) modifications to the HCFCD 1D HEC-RAS model. We reviewed hydrology models including the HCFCD regulatory model based on the USACE Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS), as well as Dr. Bedient's HEC-HMS model simulating flows during Hurricane Harvey. We also reviewed additional data and testimony as indicated below.

- USACE 2D HEC-RAS model (provided as modeling files during discovery labeled with Bates number USACE189773)
- HCFCD 1-D HEC-RAS model (HCFCD, 2018a)
- Dr. Bedient's 1D HEC-RAS model (Bedient, 2018)
- HCFCD HEC-HMS model (HCFCD, 2018a)
- 1962 Reservoir Regulation Manual (RRM) for Addicks and Barker Reservoirs Initial and Emergency Instructions to Dam Tender (USACE, 1962)
- 2012 Water Control Manual (WCM) for Addicks and Barker Reservoirs, Buffalo Bayou and Tributaries, San Jacinto River Basin, TX (USACE, 2012)
- 2014 Emergency Action Plan (EAP) for Addicks and Barker Reservoirs, Buffalo Bayou and Tributaries (USACE, 2014)
- USACE "Hurricane Harvey Flood Inundation Mapping After Action Report" (USACE, 2018)
- USACE spreadsheet of pool level, gate outflow rates, rate of rise (RoR), and calculated inflow rates typically referred to as the "morning report" according to Kauffman deposition (provided as spreadsheet during discovery labeled with Bates number USACE006034)
- U.S. Geological Survey (USGS) stream flow and water surface elevation (WSE) gauge data (USGS, 2018) at the following locations:
 - 08072500 Barker Res nr Addicks, TX
 - 08072600 Buffalo Bayou at State Hwy 6 nr Addicks, TX
 - 08073000 Addicks Res nr Addicks, TX

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- 08073100 Langham Ck at Addicks Res Outflow nr Addicks, TX
 - 08073500 Buffalo Bayou nr Addicks, TX
 - 08073600 Buffalo Bayou at W Belt Dr, Houston, TX
 - 08073700 Buffalo Bayou at Piney Point, TX
 - 08074000 Buffalo Bayou at Houston, TX
- Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for Harris County, Texas (FEMA, 2017)
- Downstream plaintiff testimony including the following plaintiffs:
 - Arnold Milton testimony on 10 July 2018 (Milton, 2018a)
 - Virginia Milton testimony on 10 July 2018 (Milton, 2018b)
 - Jennifer Shipos testimony on 19 September 2018 (Shipos, 2018)
 - John Britton, for SMC Memorial Investment 2013 LP, testimony on 16 July 2018 (Britton, 2018)
 - Jeremy Good, for Good Resources LLC, testimony on 19 July 2018 (Good, 2018)
 - Val Aldred testimony on 1 August 2018 (Aldred, 2018)
 - Peggy Hollis testimony on 19 July 2018 (Hollis, 2018a)
 - Wayne Hollis testimony on 19 July 2018 (Hollis, 2018b)
 - Peter Silverman testimony on 18 July 2018 (Silverman, 2018a)
 - Zhennia Silverman testimony on 18 July 2018 (Silverman, 2018b)
 - Arnstein Godejord testimony on 17 September 2018 (Godejord, 2018a)
 - Igna Godejord testimony on 17 September 2018 (Godejord, 2018b)
 - Dana Cutts testimony on 27 June 2018 (Cutts, 2018a)
 - Paul Cutts testimony on 27 June 2018 (Cutts, 2018b)
 - Gokhan Beyoglu testimony on 18 September 2018 (Beyoglu, 2018b)
 - Jana Beyoglu testimony on 18 September 2018 (Beyoglu, 2018a)
 - Phillip Azar testimony on 9 July 2018 (Azar, 2018)
 - Tim Stahl testimony on 5 September 2018 (Stahl, 2018)
 - Shawn Welling testimony on 14 August 2018 (Welling, 2018)
 - Dutch Lindeburg testimony on 26 September 2018 (Lindeburg, 2018)
- USACE witness testimony including the following witnesses:
 - Michael Kauffman expert testimony on 25 September 2018 (Kauffman, 2018)
 - Robert Thomas expert testimony on 31 July 2018, 3 August 2018, and 7 September 2018 (Thomas, 2018)
 - Jeff Lindner expert testimony on 24 September 2018 (Lindner, 2018)
 - Jamila Johnson expert testimony on 19 October 2018 (Johnson, 2018)

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- Braxton Coles expert testimony on 19 October 2018 (Coles, 2018)
- Texas Natural Resources Information System (TNRIS) elevation data (TNRIS, 2018)
- HCFCD precipitation data sources (HCFCD, 2018b)
- High water marks (provided as spreadsheet during discovery labeled with Bates number FEMA004231, summary tables labeled with Bates numbers USACE150516 and USGS0000032, and shapefile labeled with Bates number FEMA004230)

The list of documents considered and the modeling files referenced above can be found in **SECTION 10** at the end of this Report.

Given the limited time period for submission of this Report under the Court's schedule, we have not undertaken an effort to address all of the points and issues associated with this case, and we may revise or supplement the information in this Report as we continue to review the testimony of technical experts and eyewitnesses, the digital model files provided, and the Expert Reports submitted to the court.

We also reserve the right to examine additional information as it becomes available, including through further discovery in this case, and to add to or modify our opinions based on such additional information.

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1.5 Report Organization

This Report is organized as follows:

- **SECTION 1** describes the terms, background, mission, and scope of this Report;
- **SECTION 2** presents an introduction and factual background to the case;
- **SECTION 3** presents the 13 downstream test properties considered in this Report;
- **SECTION 4** presents a review of the data sources relied upon and a general timeline of events during Hurricane Harvey;
- **SECTION 5** provides an overview of the hydraulic modeling methodology used in developing opinions related to inundation of the 13 downstream test properties;
- **SECTION 6** provides an overview of the hydraulic modeling results discussed in the methodology section related to inundation of the 13 downstream test properties;
- **SECTION 7** presents opinions related to inundation of the 13 downstream test properties as a result of the engineering analyses conducted;
- **SECTION 8** presents opinions related to the integrity of the Addicks and Barker Reservoirs including but not limited to the spillways;
- **SECTION 9** provides preliminary opinions on the defense arguments that have been raised or potentially may be raised later; and
- **SECTION 10** presents a detailed list of references.

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SECTION 2

INTRODUCTION AND FACTUAL BACKGROUND

2.1 History and Purpose of the Reservoirs

Addicks Dam, as presently constructed, includes an earthen dam approximately 61,000 feet (ft) long, with the top of the dam at elevation 121.0 ft³ (USACE, 2012 at Sec. 2-03a). The ends of the embankment terminate at a natural ground elevation of 108.0 ft on the north end and 112.0 ft on the west end (USACE, 2012 at Sec. 2-03a). Two auxiliary spillways, located at the north and west ends of the dam embankment, were reinforced with roller-compacted concrete by September 1988 (USACE, 2012 at Sec. 2-03a; Table 3-01).

Barker Dam, as presently constructed, includes an earthen dam approximately 72,000 ft long, with the top of the dam at an elevation of 113.1 ft (USACE, 2012 at Sec. 2-03c). The ends of the embankment terminate at a natural ground elevation of 104.0 ft (USACE, 2012 at Sec. 2-03c). Two auxiliary spillways, located at the northwest and southwest ends of the dam embankment, were reinforced with roller-compacted concrete by September 1988 (USACE, 2012 at Sec. 2-03c; Table 3-01).

The USACE describes the purpose of the Addicks and Barker Reservoirs as including “flood risk management protection provided to the City of Houston from flood damages... The two reservoirs provide floodwater detention for flood risk management on the Buffalo Bayou watershed...” (USACE, 2012 at Sec. 2-02). As initially designed, the outlets of each reservoir consisted of five box culvert conduits, with one conduit gated and the other four uncontrolled (USACE, 2012 at Sec. 3-02). By February 1963, all of the conduits on both reservoir outlets had been gated (USACE, 2012 at Table 3-01). According to the USACE, “the gating of the last two uncontrolled conduits on both projects in 1963 made it possible to reduce downstream flooding...” (USACE, 2012 at Sec 3-05).

2.2 USACE Considerations in Operating the Reservoirs

An October 2009 “Draft Operational Assessment of the Addicks and Barker Reservoirs” (USACE, 2009; USACE464017), confirms that “[t]he sole authorized purpose for Addicks and Barker Reservoirs is to reduce potential flood damage along the downstream reach of Buffalo Bayou” (USACE, 2009 at USACE464026). The 2009 “Draft Operational Assessment” further evaluates “operational constraints” for the reservoirs, as they relate to both downstream and upstream flooding risk (USACE, 2009 at USACE464039, emphasis added):

³ Unless otherwise specified, all elevations herein are specified in feet, NAVD 1988 (North American Vertical Datum 1988, Epoch 2001).

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The increase in downstream development (and possibly downstream tributary inflow) has contributed to reductions in allowable outflows. ***The dams are operated strictly to prevent downstream flooding; therefore, the gates remain shut even if pool levels increase and flood upstream properties.*** The flood pools have never exceeded the limit of GOL [government owned land] and the homes upstream of the dams have not flooded due to the pool. However, available hydrologic models indicate that the limit of GOL would be exceeded in extreme events; for example, it is believed that if Tropical Storms Allison or Claudette had been centered on the basin, flooding of the upstream development would have occurred.

That same document generally describes the USACE's operational procedures for the reservoirs, and considerations taken into account by the USACE with respect to those procedures (USACE, 2009 at USACE46049, emphasis added):

The current procedure is to prevent downstream flooding and protect downstream properties. During a flooding event, the gates are closed and the reservoir levels are allowed to rise until they overflow the spillways. Since there is development adjacent to the GOL, these structures would be flooded during an extreme event. As noted earlier, there is significant development within the fringe area between the GOL and the maximum pool elevation. ***With such high valuation of upstream properties, it might be desirable to increase the allowable release rates from the reservoir once the downstream peak flows have occurred, and accept some increased duration of downstream flooding.***

2.3 The Purpose of Induced Surcharge Operations

Robert Thomas, the USACE's designated witness to testify regarding "[p]olicies for releases of water from the reservoirs from 2012 through the present..." testified regarding the USACE's release of water (also referred to as "induced surcharge") from the reservoirs during and after Hurricane Harvey. He testified that during Hurricane Harvey, the USACE "started surcharge regulations according to the schedules" in the USACE's 2012 WCM for the reservoirs (Thomas Depo. Vol. I at 140). Operating the reservoirs pursuant to the "induced surcharge flood control regulation" in the 2012 WCM has the effect of opening the reservoir flood control gates and inundating downstream properties (USACE, 2012 at USACE016339). These operation procedures differ from the 2012 WCM's "Normal Flood Control Regulation," which keeps the gates closed during flood events, until releases can be made in a manner that does not cause damaging downstream flooding (USACE, 2012 at USACE016338).

The USACE's 2012 WCM specifies pool level trigger points (coupled with rate of rise thresholds) for commencing induced surcharge operations. For Addicks Reservoir, the pool level trigger point for commencing induced surcharge releases from the reservoir is 101.0 ft. For Addicks Reservoir, the limits of GOL are reached at a pool level of 103.0 ft (Ex. 68 to Thomas Depo. at Table A1).

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Water Elevation Impact Tables published by the USACE in the 2014 Emergency Action Plan (“2014 EAP”) reflect the “first street flooded upstream” for Addicks Reservoir occurs at an elevation of 101.2 ft, and the “first home inundated upstream” for Addicks occurs at an elevation of 103.4 ft (USACE, 2014 at E-2). For Barker Reservoir, the pool level trigger point for commencing induced surcharge releases from the reservoir is 95.7 ft. For Barker, the limits of GOL are reached at a pool level of 95.0 ft (Ex. 68 to Thomas Depo. at Table A2). The 2014 EAP reflects that, for Barker Reservoir, “first street flooded upstream” occurs at an elevation of 94.9 ft, and “first home inundated upstream” occurs at an elevation of 97.1 ft (USACE, 2014 at E-4).

Robert Thomas testified regarding the purpose of making induced surcharge releases (Thomas Depo. Vol. I at 136-138):

- Q. And what are induced surcharge releases?
- A. Generally, that refers to releases within the induced surcharge regulation schedule.
- Q. What is the purpose of making induced surcharge releases?
- A. The purpose of making induced surcharge releases is to, as it says above, utilize the maximum extent possible for the reservoirs.

* * *

- Q. [I]t’s maximize storage and then prevent water from going around the ends of the dams. Is that what you said?
- A. Right. And in general, to prevent a damaging condition to the dams.

The USACE’s action in commencing induced surcharge operations burdened the downstream test property owners with flooding, by discharging water downstream that, under normal flood control regulation procedures would have protected the downstream test properties by being retained upstream, diverted over the auxiliary spillways to other areas, or released downstream at a later date in a non-damaging manner.

2.4 The Cause of Inundation During Harvey – USACE’s Release of Waters from the Addicks and Barker Reservoirs Pursuant to its Water Control Manual

When the USACE opened the flood control gates for the Addicks and Barker Reservoirs, it did so pursuant to its 2012 WCM for the reservoirs, and released substantial additional water into Buffalo Bayou. The hydraulic modeling, testimony, and other evidence analyzed throughout this Report show that, had the Addicks and Barker gates remained closed, the downstream test properties would not have been inundated (other than the small number of test properties that experienced minimal flooding prior to the gates opening). The opening of the gates by the USACE was thus the cause of inundation and/or worsened and prolonged inundation experienced by the downstream test property owners.

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2.5 USACE Knew in Advance of Opening of the Flood Control Gates the Full Extent of the Damaging Inundation of Downstream Test Properties that Would Occur

Considering the amount of water released according to the induced surcharge schedules in the 2012 WCM, the USACE knew in advance of opening the flood control gates the scope and extent of anticipated downstream inundation. A 2016 “Memorandum for Record,” prepared after the Tax Day Flood and before Hurricane Harvey, indicates that the USACE was aware of what land areas flood first downstream, and at what flow release rates (Ex. 68 to Thomas Depo. at USACE02034):

Determinations of potential flood damages were assessed using USACE surveys of 1st floor structure elevations and Buffalo Bayou reconnaissance of requested releases after the Memorial Day Flood of 2015 and the Tax Day Flood of 2016. Using USACE surveys of 1st floor elevation data, it was determined that the lower level of homes in the vicinity of the West Beltway Bridge (approximately 6.5 miles downstream of the reservoirs) experience flooding at discharges in Buffalo Bayou of 4,100 cfs. This data is consistent with complaints of property inundation typically received by the District at discharges of 3,000 cfs and above. At flows greater than 4,100 cfs, a large percentage of the structures incurring flood damage are located between the bridges over Buffalo Bayou at North Wilcrest Drive (approximately 5 miles downstream of the reservoirs, measured along the streambed) and Chimney Rock Road (approximately 16 miles downstream of the reservoirs).

Both the 2012 WCM and 2014 EAP also contain constant flow area maps, which model downstream Buffalo Bayou inundation at various flow rate assumptions, up to 20,000 cfs (well in excess of the maximum combined release rates from Addicks and Barker Reservoirs during Hurricane Harvey). **Figure 2-1** shown below provides an example of the “Buffalo Bayou Constant Flow Area Map” inundation modeling information available to the USACE prior to Hurricane Harvey.

Mr. Thomas testified that, at the time of Hurricane Harvey, the USACE had the capability to evaluate and to know in advance of opening the flood control gates the full extent of downstream inundation that would occur by street, intersection, and block, within the accuracy of the model itself (Thomas Depo. Vol. III at 547, 556):

- Q. Was the Corps able to ascertain from this modeling what the water surface elevation was at each of those CFS levels?
- A. So the RAS model does estimate elevation and discharge, sir.
- Q. And that was knowledge that the Corps had at the time this was created, this manual and this model was created?
- A. Yes, sir.

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Q. And knowledge that the Corps had at the time of Harvey?

A. Yes, sir.

* * *

Q. Well, you can tell me that the Corps has the capability of zooming in on a model such as 5A?

A. Yes, sir.

Q. You have that technical capability?

A. Yes, sir.

Q. And had it at the time of Harvey?

A. Yes, sir.

Q. So the Corps had the capability to zoom in on a constant flow map or an inundation map, did it not?

A. Yes, sir.

Q. And had that capability at the time of Harvey?

A. Yes, sir.

Q. And the Corps could by zooming in on either this constant flow map or the inundation maps being run pre-Harvey or during the time of Harvey actually identify streets and intersections and blocks on the inundation map?

A. Right. Within the accuracy of the model, sir.

After Hurricane Harvey, the USACE undertook an effort to calculate the percentage of flow in downstream Buffalo Bayou attributable to the reservoir releases (Ex. 73 to Thomas Depo). At times, after the induced surcharge releases began, USACE calculated that up to 100% of flow in Buffalo Bayou was attributable to reservoir releases (Ex. 73 to Thomas Depo).

In addition to the constant flow area maps presented in the 2012 WCM and 2014 EAP, the USACE would have readily had access to the recently prepared Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) dated 6 January 2017 (FEMA, 2017). Detailed Flood Profiles are presented in Volume 8 of the FIS, which include the full length of Buffalo Bayou. These exhibits (included as **Attachment 1** to this Report) present the water surface elevations along the full length of Buffalo Bayou for a range of flows. Table 3 in Volume 1 of the FIS presents peak discharges associated with the 10-, 50-, 100-, and 500-year storm events at six locations along Buffalo Bayou (also included in **Attachment 1** to this Report). Each of these flows are directly associated with the various water surface elevations presented on the exhibits included as **Attachment 1**.

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2.6 There Was No Emergency – The Reservoirs Performed as Expected by USACE

A 27 October 2017 USACE “Memorandum for Commander” states that the reservoirs performed as expected during Hurricane Harvey (Ex. 25 to Thomas Depo. at USACE016689, emphasis added):

The embankment, outlet structures, and emergency spillways functioned as intended. Piezometers, settlement pins, and alignment surveys for the outlet structures do not shown [sic] any alarming trends from this pool of record. There were no observations of seepage, or critical distress areas located on the dams. Wet areas located on the downstream embankment toe were monitored, but showed no signs of flow... *Overall conclusion is that the project was performing as expected with no significant problems during this pool of record event.*

Mr. Thomas testified regarding the purpose of the Memorandum (Thomas Depo. Vol. II at 265):

- Q. What is the purpose of this Memorandum for Commander that has been marked as Exhibit 25? Why was it prepared?
- A. After every flood of record, we prepare a document documenting the state of the dams immediately afterward.
- Q. Is one of the purposes of preparing this memorandum to assess whether or not the Addicks and Barker dams and reservoirs performed as expected during that new pool of record?
- A. Yes, sir.

A “Report of Performance” enclosed with the Memorandum reflects that “the Addicks and Barker dams’ watersheds received between 32-35 inches of rain during a 4-day period, August 25, 2017 through August 29, 2017...” (Ex. 25 to Thomas Depo. at USACE016691). Accordingly, the Memorandum’s finding concerning dam performance during Hurricane Harvey is consistent with the design criteria for the reservoirs, as the “spillway design flood” for the reservoirs is “computed as 44.6 inches in 72 hours, with a peak intensity of 11.3 inches” (USACE, 2012 at Sec. 8-02a).

The Memorandum’s findings are also consistent with the fact that no formal declaration of Level 1, Level 2, or Level 3 “Emergency” was made during Hurricane Harvey, as defined in the 2014 EAP for the reservoirs (USACE, 2014 at 15-16). A Level 1 emergency (the lowest level in the EAP) is defined as “a developing condition in which the dam has not failed but possibly could if the situation continues to develop” (USACE, 2014 at 15). In fact, Mr. Thomas testified that he was not aware of any Level 1, 2, or 3 emergency ever having been formally declared in the history of the dams (Thomas Depo. Vol. II at 275):

- Q Has there ever been a formal declaration of a Level 2 emergency in the history of the Addicks and Barker dams and reservoirs?

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- A. Not that I know of, sir.
- Q. Has there ever been a formal declaration of Level 1 emergency?
- A. Not that I know of, sir.
- Q. Has there ever been a formal declaration of Level 3 emergency?
- A. Not that I know of, sir.

Per USACE's own post-Harvey report, there is no credible evidence that any emergency implicating possible dam failure existed at the time of Hurricane Harvey.

2.7 Summary of Conclusions

During and after Hurricane Harvey, Addicks and Barker Reservoirs were operated in a manner that caused downstream flooding as a result of induced surcharge operations. Induced surcharge operations had the effect of mitigating upstream inundation, to the detriment of downstream properties, which experienced inundation that otherwise would not have occurred. At the time of Hurricane Harvey, USACE knew – with specificity to streets, blocks, or intersections – the downstream impact of its decision to release water from Addicks and Barker Reservoirs pursuant to the 2012 WCM's induced surcharge procedures. As explained in this Report, action undertaken by USACE to open the Addicks and Barker gates was the decision that caused the downstream test properties to be inundated, and those properties would not have been inundated, and/or would not have been inundated to the extent experienced during and after Hurricane Harvey, but for the induced surcharge release⁴. This decision to abandon from the long-standing policy of protecting downstream properties increased the duration and depth of inundation.

⁴ No conclusions can be reached to a reasonable degree of scientific and engineering probability with respect to downstream test property #12 Stahl

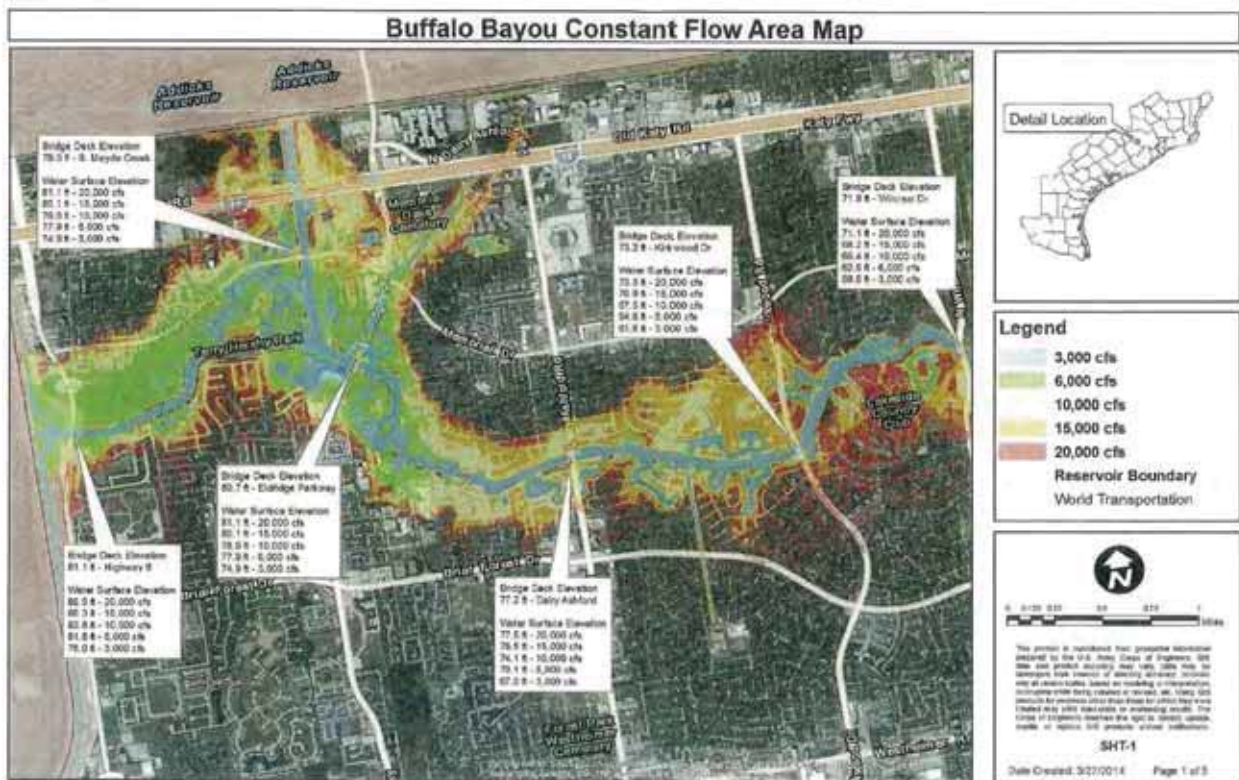


Figure 2-1: Exhibit 5A to Thomas Depo (USACE, 2014)

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SECTION 3

TEST PROPERTIES

The list of plaintiffs considered in this Report are based on the “Order Regarding Test Property Selection” Document 81, filed 28 March 2018. The only amendment to the list of plaintiffs identified in Document 81 is the removal of the Becky Ho property at 419 West Sam Houston Parkway North. The remaining 13 downstream test properties which were investigated for this Report are summarized in **Table 3-1** below. The “Zone” identification is based on the “Consolidated and Amended Downstream Master Complaint” Document 23, filed 16 January 2018. The only amendments to the zones identified is that the Good Resources LLC property and the Phillip Azar property were not originally identified in the “Consolidated and Amended Downstream Master Complaint.” These 13 downstream test properties, together with the zone designations are shown in **Figure 3-1** (together with associated sub-figures).

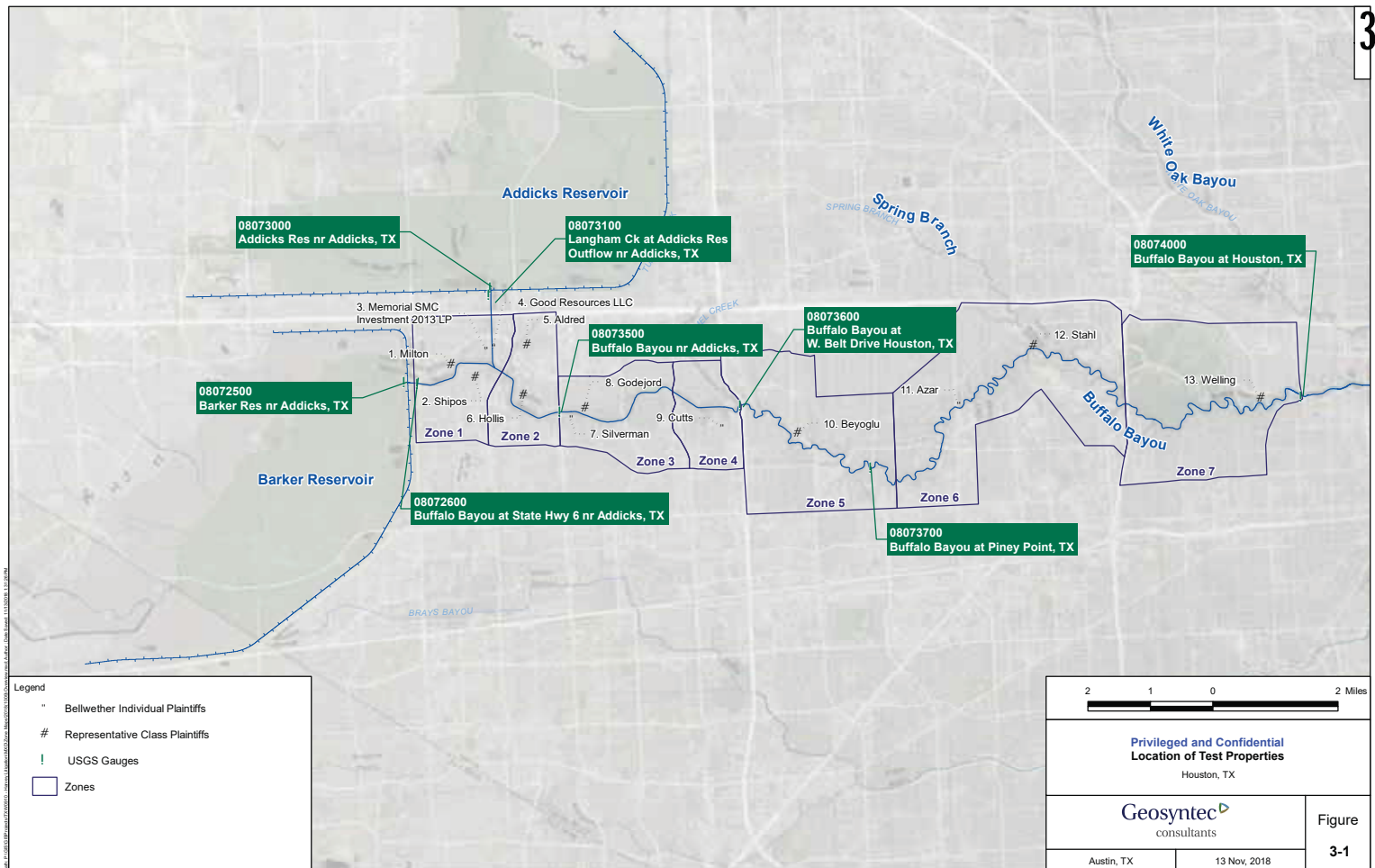
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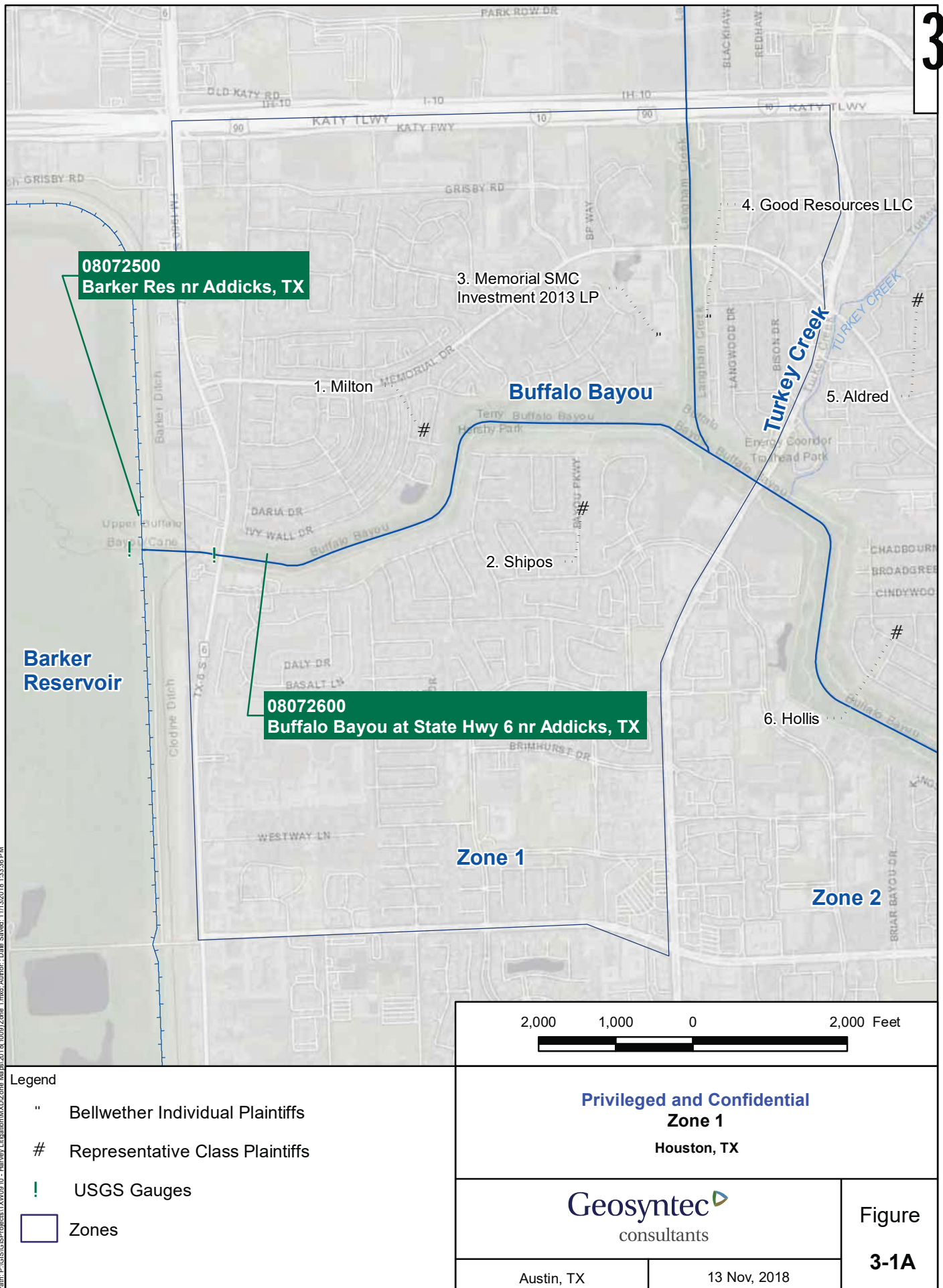
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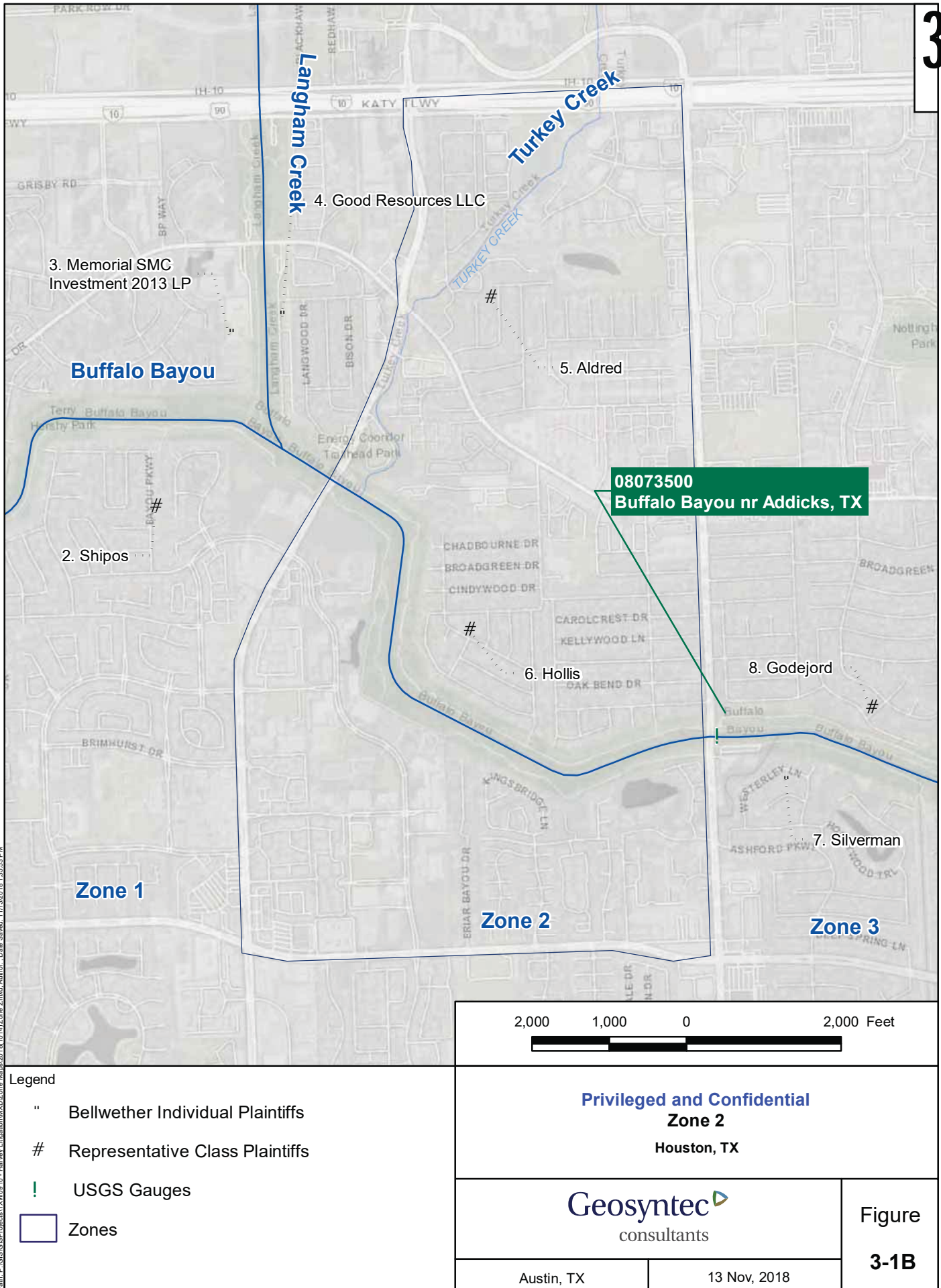
Table 3-1: List of Test Properties

Number	Plaintiff Name	Plaintiff Type	Address	Zone
1	Milton, Virginia and Arnold	Representative Class Plaintiff	850 Silvergate Drive	1-North
2	Shipos, Jennifer	Representative Class Plaintiff	931 Bayou Pkwy	1-South
3	Memorial SMC Investment 2013 LP	Bellwether Individual Plaintiff	777 S Mayde Creek Drive	1-North
4	Good Resources LLC	Bellwether Individual Plaintiff	760 Memorial Mews St. #4	1-North
5	Aldred, Val	Representative Class Plaintiff	835 Thornvine Lane	2-North
6	Hollis, Wayne and Peggy	Representative Class Plaintiff	14914 River Forest Drive	2-North
7	Silverman, Peter and Zhennia	Bellwether Individual Plaintiff	12515 Westerley Lane	3-South
8	Godejord, Arnstein and Igna	Representative Class Plaintiff	14334 Heatherfield Drive	3-North
9	Cutts, Paul and Dana	Bellwether Individual Plaintiff	311 Blue Willow Drive	4-South
10	Beyoglu, Jana and Gokhan	Representative Class Plaintiff	107 Warrenton Drive	5-North
11	Azar, Phillip	Bellwether Individual Plaintiff	3 Magnolia Bend Drive	6-North
12	Stahl, Tim	Representative Class Plaintiff	265 Chimney Rock Road	6-North
13	Welling, Shawn	Representative Class Plaintiff	5731 Logan Lane	7-North

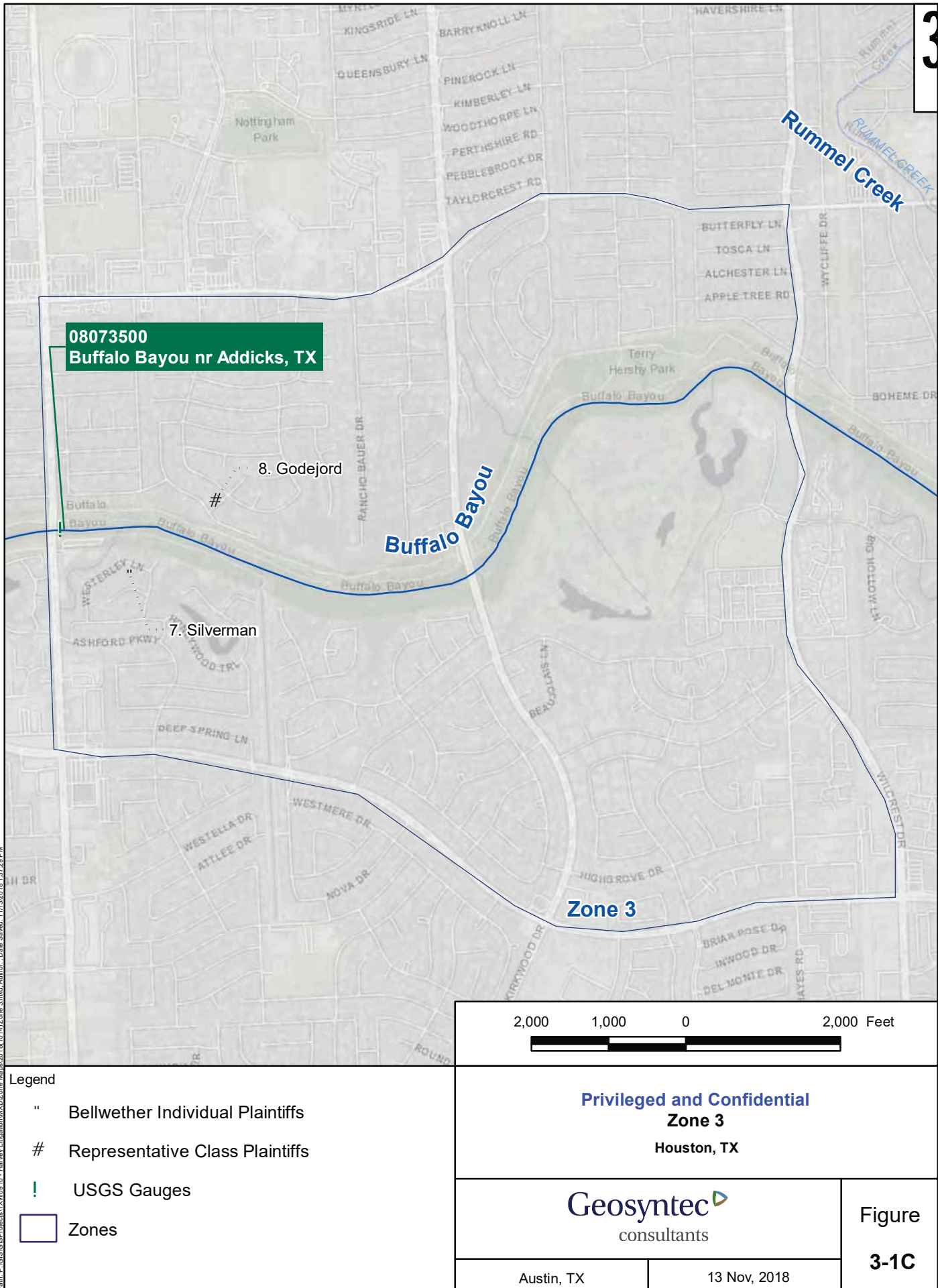
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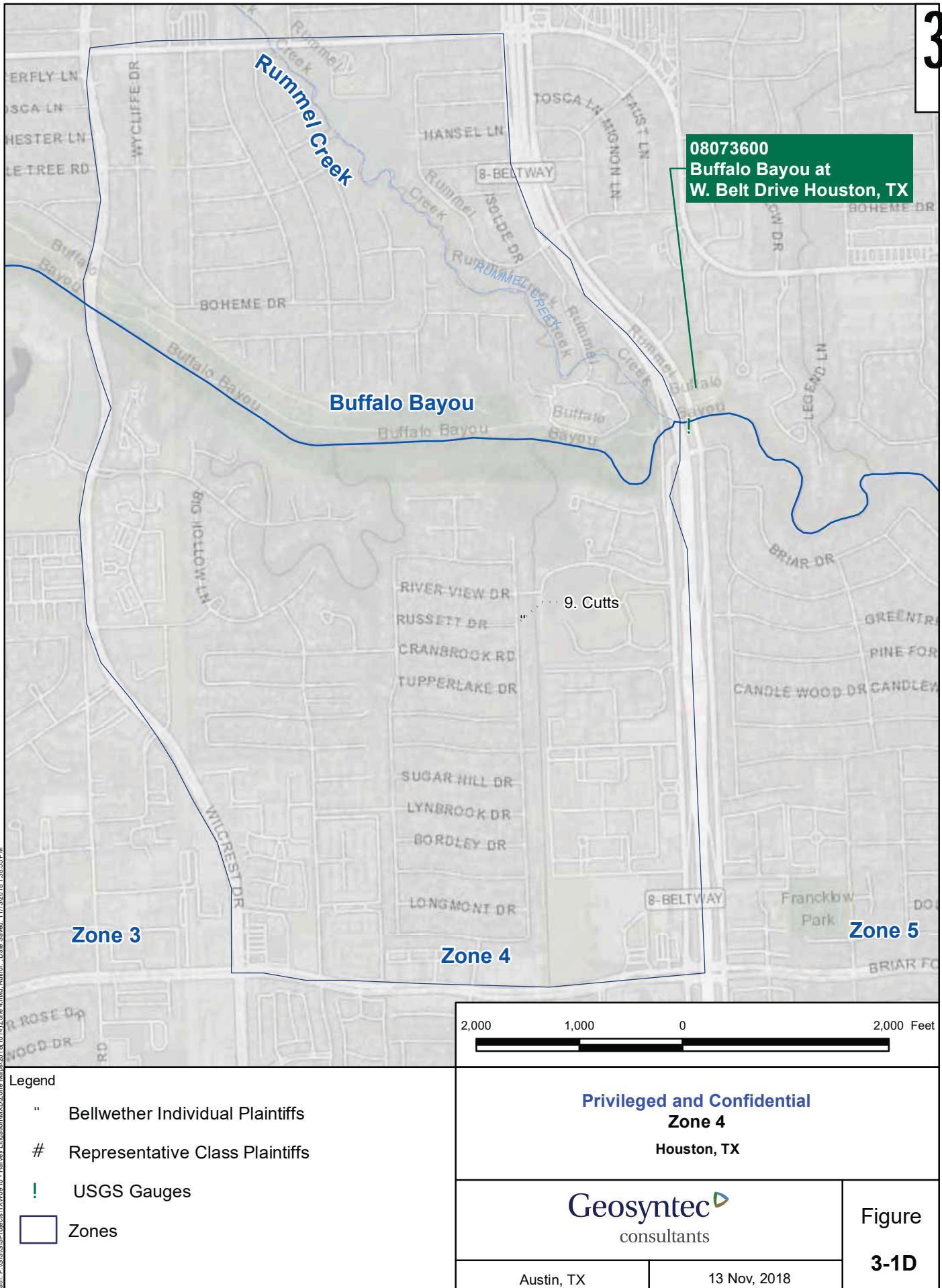


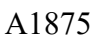


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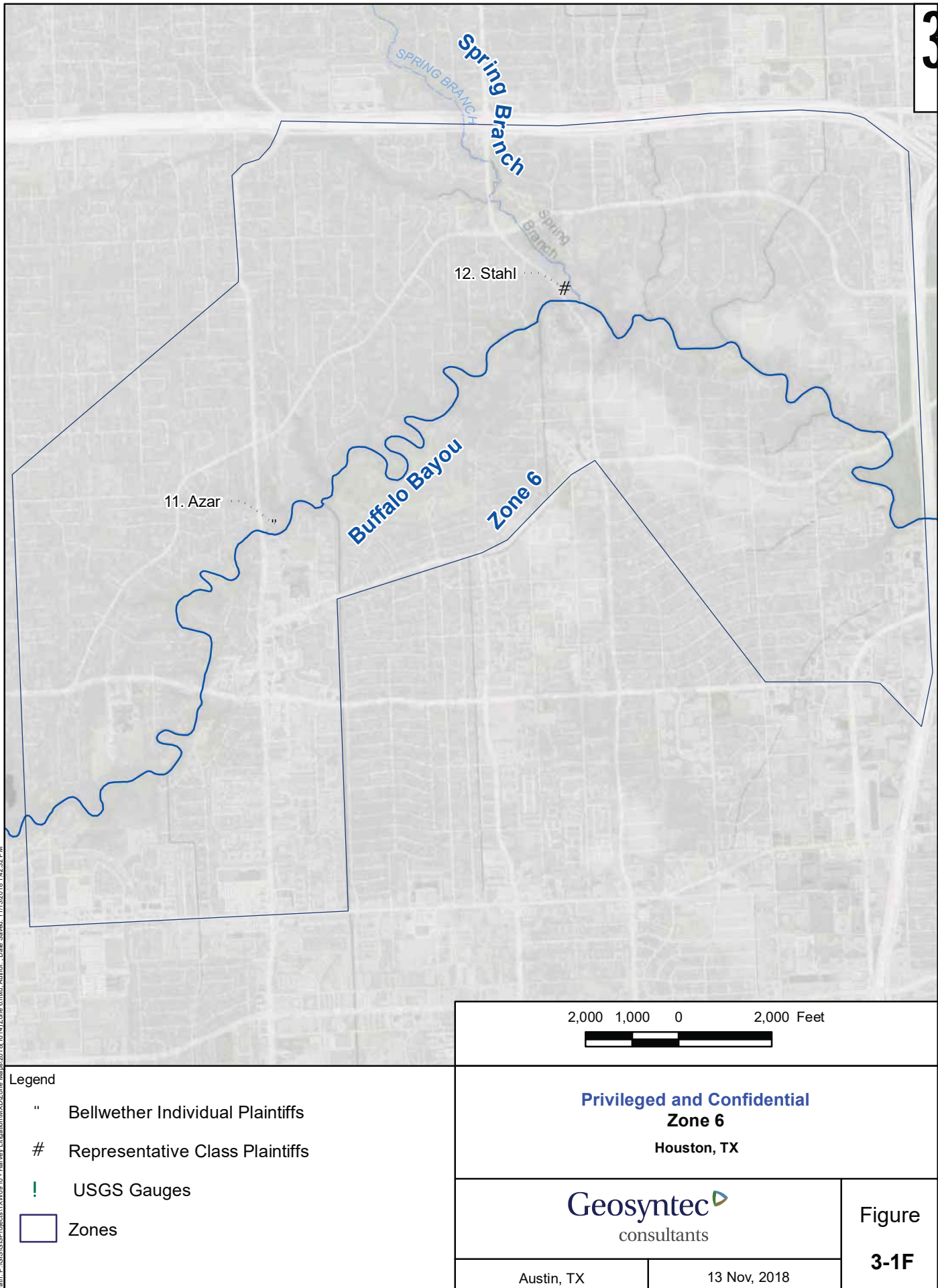


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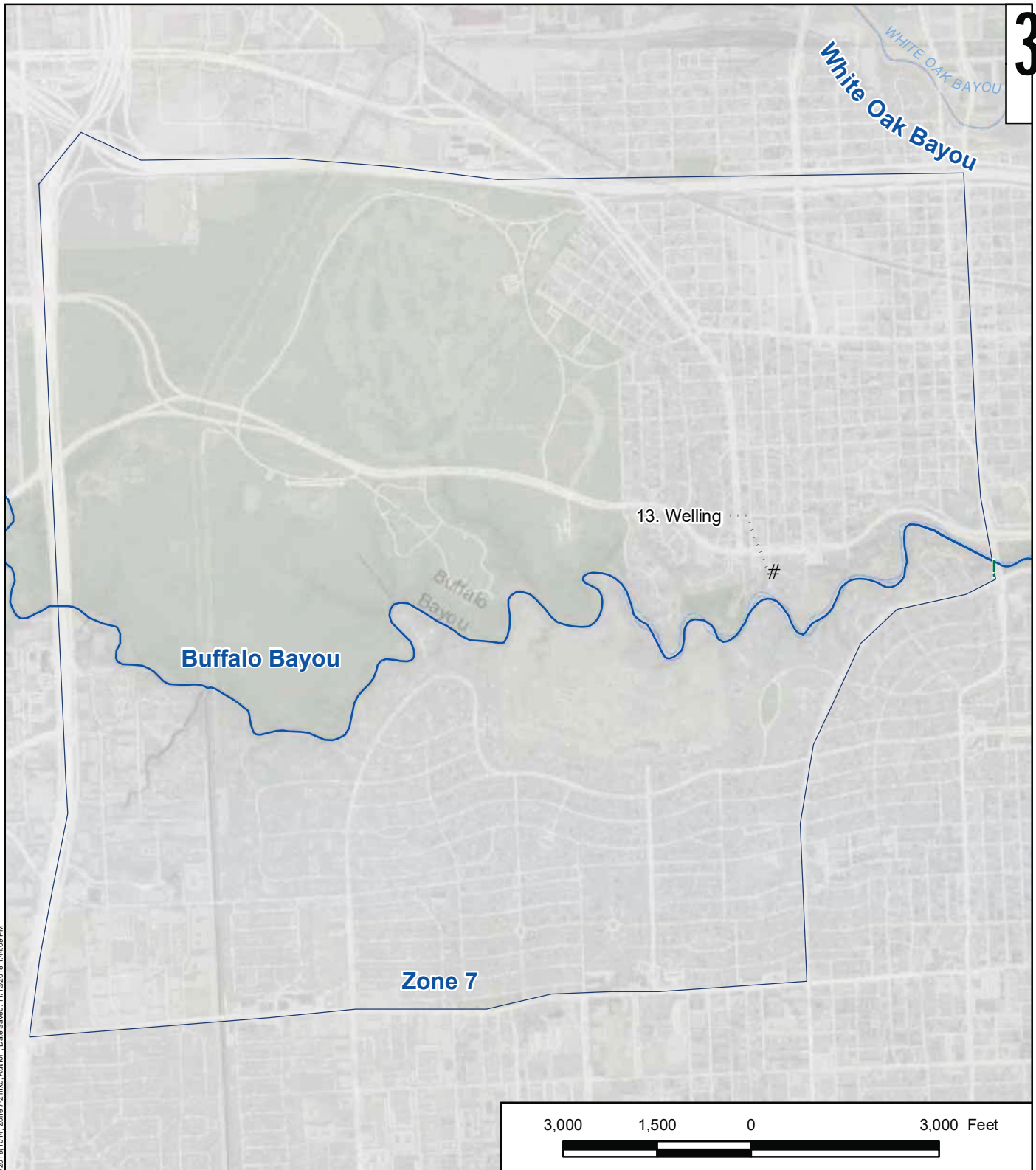




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3



<p>Legend</p> <p>" Bellwether Individual Plaintiffs</p> <p># Representative Class Plaintiffs</p> <p>! USGS Gauges</p> <p>□ Zones</p>	<p>Privileged and Confidential</p> <p>Zone 7</p> <p>Houston, TX</p>	
<p>Geosyntec consultants</p>		<p>Figure</p> <p>3-1G</p>
<p>Austin, TX</p>	<p>13 Nov, 2018</p>	

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SECTION 4

TIMELINE OF EVENTS AND OBSERVATIONS

4.1 Introduction

This section presents a brief overview of the reported timeline of events and observations that were analyzed during the development of opinions. Source data, supporting information, and supplemental analyses are provided in subsequent sections of this Report and as separate appendices, where referenced.

4.2 Timeline of Events based on Available Data

Gauge data, downstream test property owner plaintiff testimony, reported USACE gate outflow rates, and the USACE After Action Report (USACE, 2018) were reviewed to develop a general timeline of events and actions taken by the USACE. The timeline summarized in the outline below, together with **Figure 4-1** of the gauge data, establishes reported gate release rates and inundation levels. All reported dates are in 2017 during and following Hurricane Harvey in the Houston area. Property information is based on plaintiff name and number as indicated in **Table 3-1** above along with property inundation reported by the plaintiffs as indicated in **Table 4-1** in the following section.

- August 25 – Harvey makes landfall near Rockport, Texas; approximately one inch of rain falls in the Houston area beginning around 5:00 am
 - Properties reporting initial inundation based on testimony:
 - #11 Azar (minor inundation)
- August 26 – Rain continues, approximately 8.5 inches; pool levels within the reservoirs begin to rise
- August 27 – Rain continues, approximately 15.5 inches
 - Properties reporting initial inundation based on testimony:
 - #3 Memorial SMC (multiple buildings; not all may have been inundated)
 - #10 Beyoglu (reported minor inundation)
- August 27 into 28 – Reservoir gates opened and induced surcharge releases made downstream to Buffalo Bayou; pool levels in the reservoirs continue to rise; approximately 7.5 inches of rain
 - Addicks gates opened at no later than 1:00 am on August 28
 - peak discharge <3,000 cfs
 - peak pool level at 106.59 ft
 - Barker gates opened at no later than 1:15 am on August 28

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- peak discharge <2,700 cfs
- peak pool level at 100.22 ft
- August 28
 - Properties reporting initial inundation based on testimony:
 - #1 Milton
 - #4 Good Resources
 - #6 Hollis
 - #11 Azar had minor inundation on August 25 but reported significant inundation starting August 28 resulting in up to 9.75 ft of inundation
 - #12 Stahl estimates inundation began on August 28 based on USGS gauges
 - #13 Welling
- August 29 – Uncontrolled releases (also referred to as “flanking flows”) around the spillway on the north end of Addicks occurs; approximately 2.5 inches of rain occurred and stopped
 - Addicks gates remained opened
 - peak discharge <6,500 cfs
 - peak pool level at 108.98 ft
 - uncontrolled releases (flanking flows) started at 7:15 am
 - Barker gates remained opened
 - peak discharge <5,000 cfs
 - peak pool level at 101.53 ft
 - Properties reporting initial inundation based on testimony:
 - #2 Shipos
 - #7 Silverman
 - #8 Godejord
- August 30 – Pool levels in both reservoirs at or near peaks; Barker was 80% full; Addicks was 100% full; no rain occurred
 - Addicks gates remained opened
 - peak discharge <6,400 cfs
 - overall peak pool level at 109.09 ft occurred at 7:00 am
 - uncontrolled releases (flanking flows) also occurred
 - Barker gates remained opened
 - peak discharge <5,000 cfs
 - overall peak pool level at 101.56 ft occurred at 6:00 am
 - Properties reporting initial inundation based on testimony:

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- #5 Aldred
 - #9 Cutts
- August 31 – pool levels begin to fall
 - Addicks gates remained opened
 - peak discharge <5,300 cfs
 - peak pool level at 109.02 ft
 - uncontrolled releases (flanking flows) also occurred
 - Barker gates remained opened
 - peak discharge <4,800 cfs
 - peak pool level at 101.37 ft
- September 1 – pool levels continue to fall
 - Addicks gates remained opened
 - peak discharge <5,300 cfs
 - peak pool level at 108.57 ft
 - uncontrolled releases (flanking flows) stopped around 8:30 pm
 - Barker gates remained opened
 - peak discharge <4,600 cfs
 - peak pool level at 100.80 ft
- September 2 – mandatory evacuation order issued by City of Houston
 - Addicks gates remained opened
 - peak discharge <5,200 cfs
 - peak pool level at 107.90 ft
 - Barker gates remained opened
 - peak discharge <4,600 cfs
 - peak pool level at 100.16 ft
- September 10 – Tailwater conditions ended at Barker
 - Barker tailwater conditions reported to end at elevation 77.28 ft at 7:00 am
- September 11 – Tailwater conditions ended at Addicks
 - Addicks tailwater conditions reported to end at elevation 73.71 ft at 7:00 pm
- September 18 – gate discharge rates ended
 - Addicks – gates closed at 6:15 pm
 - Barker – gates closed at 7:00 pm
- September 19 – gates opened again

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- Addicks – gates opened at 1:15 pm at <2,200 cfs until end of record in “morning report” spreadsheet on 10/13
- Barker – gates opened at 2:45 pm at <1,000 cfs until end of record in “morning report” spreadsheet on 9/25

Figure 4-1 presents a composite general timeline of events from 25 August through 12 September 2017. The gauge number of the four USGS gauges along Buffalo Bayou used in the development of the graph are indicated in the legend. The outflow from the reservoirs represents the composite discharge from the gates of the two reservoirs (Addicks and Barker). The flow rate is based on the USACE reported values per the USACE006304 spreadsheet. The precipitation values are based on an analysis of precipitation data for 44 gauges from 24 August to 30 September 2017 obtained from the HCFCD website (HCFCD, 2018). Thiessen polygons were generated for the precipitation gauges to account for the spatial variability in the precipitation (see **Appendix B**). Each Thiessen polygon was assigned the rain gauge that fell in it. An area weighed total precipitation was calculated based on the precipitation timeseries and area of Thiessen polygons. The precipitation analysis is detailed in **Appendix B**.

4.3 Plaintiff Testimony of Observed Conditions

According to downstream plaintiff testimony, **Table 4-1** below summarizes the reported estimated time of first inundation, the estimate of maximum observed inundation, and the duration/dates when the plaintiff could not access the property due to inundation (which is representative of the time duration that the property was inundated). Based on the testimony summarized in **Table 4-1**, downstream test properties #3, #10, and #11 reported to have minimal inundation prior to the USACE opening the gates.

The Elevation Certificates for each of the downstream test properties were reviewed in order to investigate the slab elevation of the building structure on the property. The slab elevation was compared to the estimate of maximum observed inundation depth according to the plaintiff testimony in order to calculate an estimate of maximum water surface elevation. **Table 4-2** presents the slab elevation and calculated estimate of maximum observed water surface elevation for each of the 13 downstream test properties.

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Table 4-1: Summary of Plaintiff Testimony Regarding Inundation

Number	Plaintiff Name	Estimate of First Inundation	Estimate of Maximum Observed Inundation	Duration Property was Inaccessible
1	Milton, Virginia and Arnold	8/28, 3:00 am	4.33 ft	Until 9/10
2	Shipos, Jennifer	8/29	1.25 ft	Until 9/4
3	Memorial SMC Investment 2013 LP	8/27, late night	5.5 to 6.0 ft	Until 9/11
4	Good Resources LLC	8/28, 11:19 am	3.33 ft	Until 9/10
5	Aldred, Val	8/30	1.5 ft	Until 9/2
6	Hollis, Wayne and Peggy	8/28	3.75 ft	Until 9/9
7	Silverman, Peter and Zhennia	8/29	1.5 ft	Until 9/8
8	Godejard, Arnstein and Igna	8/29	2.83 ft	Until 9/8
9	Cutts, Paul and Dana	8/30, 3:00 am	0.67 ft	Until 9/7
10	Beyoglu, Jana and Gokhan	8/27	2.0 ft on 8/27; up to 4.0 ft on 8/29	Until 9/6
11	Azar, Phillip	8/25	Up to 9.75 ft on 8/28	Until 9/10
12	Stahl, Tim	8/28	3.33 ft	Until 8/29
13	Welling, Shawn	8/28	10.0 ft	Until 9/1

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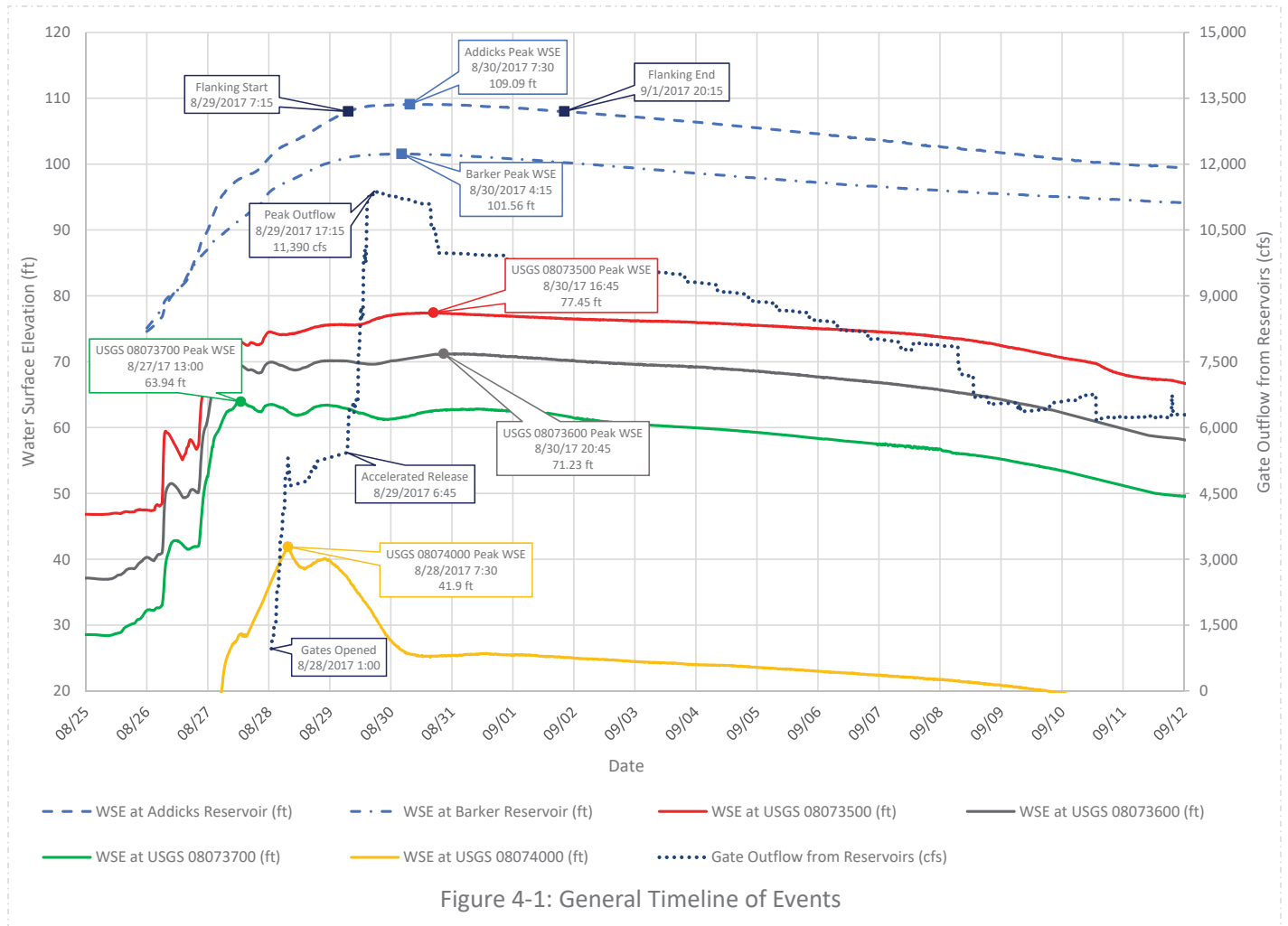
Table 4-2: Slab Elevations and Plaintiff Testimony Regarding Water Surface Elevations

Number	Plaintiff Name	Elevation Certificate Slab Elevation (ft)	Estimate of Maximum Observed Water Surface Elevation (ft)
1	Milton	78.61	82.94
2	Shipos	80.90	85.15
3	Memorial SMC ^a	77.00 to 77.90	83.00 to 83.40
4	Good Resources	78.50	81.83
5	Aldred	80.20	81.70
6	Hollis	76.50	80.25
7	Silverman	75.09 ^b	76.59
8	Godejord	74.00	76.83
9	Cutts	72.00	72.67
10	Beyoglu	70.10	74.10
11	Azar	48.94	58.69
12	Stahl	52.10	55.43
13	Welling	39.40 ^c	49.40

Notes: ^a The #3 Memorial SMC property consists of approximately 15 different building structures which have a range of slab elevations according to their corresponding Elevation Certificates.

^b Elevation Certificate was not available for #7 Silverman although the property had been surveyed with a slab elevation of 75.09 ft by South Texas Surveying Associates, Inc.

^c The slab elevation of 39.40 ft for #13 Welling corresponds to the lowest elevation of machinery or equipment servicing the building; the slab elevation of the first floor is 47.40 ft both of which are reported on the Elevation Certificate. The reported inundation depth based on plaintiff testimony is with respect to the machinery elevation below the first floor elevation.



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SECTION 5

METHODOLOGY OVERVIEW

5.1 Methodology Summary

Several lines of evidence, models, testimony, and data were used to develop the opinions presented in SECTION 7. An overview of these methods is described here with specific details discussed in the referenced appendices. As part of these methods, both the reported gate releases during Hurricane Harvey in general accordance with the Induced Surcharge Operations Schedule documented in the 2012 WCM (USACE, 2012) referred to as the “gates opened” scenario, as well as a hypothetical “gates closed” scenario if the USACE had not opened the gates during Hurricane Harvey in accordance with the normal flood control regulation of the 2012 WCM were considered. An overview of hydraulic model results is provided in SECTION 6.

5.2 HEC-HMS Model Methodology

Dr. Bedient’s HEC-HMS model, which was modified from the HCFCD HEC-HMS model, was used for this analysis. The hydrologic model results were compared to observed USGS flow data during Hurricane Harvey. Dr. Bedient further modified this HEC-HMS model to consider a gates closed scenario with no flanking flows (i.e., an infinitely large reservoir capacity). The purpose of the HEC-HMS gates closed model was to evaluate and quantify precipitation-only flows within Buffalo Bayou. Flanking flows and where they occur from the reservoirs were quantified using the enhanced 2D HEC-RAS model (see Section 5.3.1 below).

Dr. Bedient’s HEC-HMS model was modified to include USGS measured flow rates near Addicks and Barker Reservoirs instead of the USACE calculated gate outflow rates. In addition, flanking flows were included where they return to Buffalo Bayou in the HEC-HMS model. The unsteady flow rates within Buffalo Bayou were calculated from these modifications to Dr. Bedient’s HEC-HMS model for the gates opened and gates closed hydraulic model scenarios. The flow rates within Buffalo Bayou are considered “unsteady” since they vary with time. The unsteady flows within Buffalo Bayou obtained from the HEC-HMS model and the flanking flows obtained from the enhanced 2D HEC-RAS model were used as input to the 1D HEC-RAS model for both the gates opened and gates closed scenarios. **Appendix B** presents additional details associated with the development of the HEC-HMS hydrology model.

5.3 HEC-RAS Model Methodology

HEC-RAS models were utilized to predict inundation depths related to the gates opened and gates closed hydraulic model scenarios. In both the gates opened and gates closed scenarios, water within Addicks Reservoir is expected to flank around the ends of the dam when the storage capacity of the reservoir is exceeded, and eventually this water will return to Buffalo Bayou at

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downstream locations. The enhanced 2D HEC-RAS model was used to quantify the amount and identify the location of where the flanking flows return to Buffalo Bayou. The 1D HEC-RAS model was used to quantify the resulting water surface elevation for both scenarios while taking into account the flanking flows for each scenario.

5.3.1 2D HEC-RAS Model

The original 2D HEC-RAS model developed by USACE to analyze the two gate operation scenarios was used as the basis for the 2D HEC-RAS analysis. In particular, model enhancements were made to the USACE 2D HEC-RAS model to gain a general understanding of downstream flow rates and inundation depths. These model enhancements are described in more detail in **Appendix C** with specific modeling results related to flanking flows presented in **Section 6.2**. The enhanced 2D HEC-RAS model was developed to investigate the gates opened and gates closed scenarios primarily to assess when flanking flows are expected to occur under both scenarios, where those flows might be conveyed downstream, and the resulting flow rates and locations where the flanking flows returned to Buffalo Bayou. As further discussed in **Section 6.2** below, the gates closed scenario analysis results in larger flanking flows at Addicks Reservoir, but flanking flows would not have occurred at Barker Reservoir. Furthermore, the enhanced 2D HEC-RAS model is useful for understanding the tools and models available to USACE during Hurricane Harvey for the prediction of downstream inundation.

Although the enhanced 2D HEC-RAS model can provide good estimates of where flanking flows are expected to occur on a specified terrain, the enhanced 2D HEC-RAS model is not as precise in approximating actual flow depths and extent of inundation due to the lack of detailed channel geometry, bridge structures, culvert structures, and other hydraulic controls. Furthermore, HEC-RAS is primarily a hydraulic modeling tool and was not originally developed for detailed hydrologic modeling. Based on these limitations of the 2D HEC-RAS model, a 1D HEC-RAS model was used to explicitly represent the hydraulic controls to approximate flow depths along Buffalo Bayou, along with a HEC-HMS model to conduct hydrologic modeling to predict runoff flow rates into Buffalo Bayou.

5.3.2 1D HEC-RAS Model

Dr. Bedient's 1D HEC-RAS model (Bedient, 2018) for the upper portions of Buffalo Bayou immediately downstream of Addicks and Barker Reservoirs was used for this analysis. Dr. Bedient's 1D HEC-RAS model was combined with the HCFCD 1D HEC-RAS model for the entire length of Lower Buffalo Bayou. The combined 1D HEC-RAS model explicitly represents hydraulic controls and will better approximate flow depths within Buffalo Bayou than the 2D HEC-RAS model. It is our understanding that the basis for Dr. Bedient's 1D HEC-RAS model is the HCFCD regulatory model (HCFCD, 2018a). However, the HCFCD 1D HEC-RAS model is a steady state floodplain model and required minor alterations to allow for unsteady state flows as described in **Appendix B**.

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The 1D HEC-RAS model gates opened scenario was developed to simulate the baseline condition, as it occurred during Hurricane Harvey and approximate the water surface elevation along Buffalo Bayou. The 1D HEC-RAS model gates closed scenario was developed to simulate the alternate condition if the gates had not been opened in accordance with the normal flood control regulation of the 2012 WCM. A single geometry file was used for both scenarios. The hydraulic features, such as bridges and channel geometry, represented in the 1D HEC-RAS model are consistent between the gates opened and gates closed model scenarios. The only difference between the two modeled scenarios is the flow inputs; the flow inputs are described below.

- (i) The unsteady stormwater runoff flow rates from the watershed directly tributary to Buffalo Bayou were obtained from the HEC-HMS model. These flow rates are consistent between the two modeled scenarios.
- (ii) Reservoir release rates reported by USGS gauges from the two reservoirs were used in the gates opened scenario. Under the gates closed scenario, the gates were assumed to have no flow.
- (iii) Uncontrolled flanking flows from Addicks Reservoir when the pool level within the reservoir exceeds the natural ground elevation at the end of the dam were obtained from the enhanced 2D HEC-RAS model for both the gates opened and gates closed scenarios. Each scenario had unique flanking flows that were used in the corresponding modeled scenario.

5.3.3 Evaluation and Comparison of Model Output

The modeled water surface elevation (WSE) from the combined 1D HEC-RAS model was used to support the formulation of each opinion as to which of the 13 downstream test properties were potentially impacted by inundation due to the USACE's decision to open the gates at Addicks and Barker Reservoirs according to the 2012 WCM. The modeled WSE from the combined 1D HEC-RAS model for both scenarios compared to the downstream test property slab elevation allows for an estimation of inundation depth at each downstream test property, as well as an estimate of the inundation duration and timing associated with the gates opened scenario. The model results, together with plaintiff testimony as to observed inundation depths and durations, form the basis of the opinions.

5.4 Analysis of Observed and Reported Conditions Methodology

In order to further support and interpret the combined 1D HEC-RAS modeling results related to inundation depths and durations, other lines of evidence related to inundation at the downstream test properties were investigated and relied upon. The deposition testimony from the 13 downstream property owners (see summary in **Section 4.3**) was reviewed and relied upon in the formulation of each of the opinions. Other information relied upon included the USGS gauge

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information, high water marks collected by multiple agencies, and published information associated with the current FEMA FIS (FEMA, 2017).

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SECTION 6

OVERVIEW OF MODEL RESULTS

6.1 HEC-HMS Model Results

The HEC-HMS model initially prepared by Dr. Bedient as summarized in his expert report (Bedient, 2018) along with the modifications made to this model by Geosyntec as described in **Appendix B** was used to develop the 1D HEC-RAS model inputs. The flow hydrographs reported from the HEC-HMS model, along with the flanking flows obtained from the enhanced 2D HEC-RAS model, were used as the primary flow inputs into the combined 1D HEC-RAS model. At the upstream boundary of the model near the Addicks and Barker Reservoirs, the measured USGS gauge flows are used as the initial input. As flows are added downstream due to either stormwater runoff or flanking flows from Addicks Reservoir, the resulting flow hydrographs are used as input to the 1D HEC-RAS model. A detailed description of the HEC-HMS model development and results are presented in **Appendix B**.

6.2 Enhanced 2D HEC-RAS Model Results

The enhanced 2D HEC-RAS model was developed using the USACE 2D HEC-RAS model as the basis for model development. A detailed description of the model enhancements are provided in **Appendix C**. The purpose of the enhanced 2D HEC-RAS model was to assess when flanking flows would occur, identify where the flows would be conveyed downstream, and quantify flow rates as they returned to Buffalo Bayou.

The enhanced 2D HEC-RAS model quantified the pool levels, flanking flow rates, and the locations of where flanking flows would return to Buffalo Bayou under the two modeling scenarios. **Table 6-1** presents the peak pool levels and flanking flows at Addicks and Barker Reservoirs for the gates closed scenario simulation compared to observed conditions during Hurricane Harvey. Although pool levels within both Addicks and Barker Reservoirs would have been higher under the gates closed scenario, Barker pool levels would still not have exceeded the natural ground at the end of the dam during Hurricane Harvey, thereby avoiding flanking flows. The simulated gates closed scenario pool levels are 1.17 ft and 2.40 ft higher within Addicks and Barker Reservoirs, respectively. Flanking flows were only predicted for Addicks Reservoir under both the gates opened and gates closed scenarios; no flanking flows were predicted for Barker Reservoir under either scenario during Hurricane Harvey. The total peak flanking flow leaving Addicks Reservoir was obtained from the enhanced 2D HEC-RAS model as 5,710 cfs for the gates closed scenario, compared to approximately 2,000 cfs for the gates opened conditions as reported during the Kauffman deposition. These flanking flows are split between the four return locations at Buffalo Bayou and are also attenuated between the end of Addicks Reservoir and the return locations.

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Figure 6-1 and **Figure 6-2** present the observed and modeled outflows and pool levels at Addicks and Barker Reservoirs, respectively. **Figure 6-3** and **Figure 6-4** present the maximum inundation extents from the enhanced 2D HEC-RAS model results for the gates opened and gates closed scenarios, respectively. The gates closed scenario shows no flanking flows occurred for Barker Reservoir. Furthermore, the flanking flows that occur at Addicks Reservoir are shown to be conveyed farther downstream before they return to Buffalo Bayou and bypass many of the downstream test properties. For example, flanking flows from Addicks Reservoir return to Buffalo Bayou via Turkey Creek, Rummel Creek, Spring Branch, and White Oak Bayou.

Table 6-2 below presents the summary of the enhanced 2D HEC-RAS model results; additional model results are presented in **Appendix C**.

6.3 Combined 1D HEC-RAS Model Results

A combined 1D HEC-RAS model was developed using Dr. Bedient's 1D HEC-RAS model and the HCFCD 1D HEC-RAS model. The inflow hydrographs were obtained for the two scenarios from the HEC-HMS model and the flanking flows from the enhanced 2D HEC-RAS model as described in **Section 5.3.2**.

After inputting the HEC-HMS flows for the gates opened scenario, the resulting 1D HEC-RAS produced flow hydrographs are very consistent with the recorded flow hydrographs at four of the USGS gauges along Buffalo Bayou (USGS 08072600 State Hwy 6; USGS 08073500 Near Addicks; USGS 08073600 W Belt Dr; USGS 08073700 Piney Point). As was observed with the HEC-HMS analysis, the gates closed scenario in HEC-RAS produced flow hydrographs that show a very distinct reduction in flow after the time the gates would have opened. To visualize the comparison of the USGS recorded flows, the 1D HEC-RAS gates open flow, and the 1D HEC-RAS gates closed flow; a series of graphical overlays have been prepared and included in **Appendix B**.

A summary of the water surface elevation and the corresponding flow rate at each test property is presented in **Table 6-3** for the two scenarios. Along with the peak water surface elevation, the slab elevation of each test property is indicated. In addition to the peak water surface elevation, the results of the 1D HEC-RAS model were used to evaluate and quantify the time the test property was likely inundated. **Figure 6-5** and the associated sub-figures present the water surface elevation hydrographs near each of the 13 downstream test properties for both scenarios.

6.4 Analysis of Observed and Reported Conditions Results

The combined 1D HEC-RAS hydraulic model results presented in **Table 6-3** together with the deposition testimony for each of the 13 downstream test property plaintiffs presented in **Table 4-1** were used to approximate the inundation depth at each property based on the building slab elevations as presented in **Table 6-4**. Furthermore, **Table 6-5** presents the deposition testimony for the reported duration of inundation at each of the 13 downstream test properties together with

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the modeled duration of inundation based on the duration the gates opened scenario WSE is higher than the peak gates closed scenario WSE. These tables, together with the WSE hydrographs in **Figure 6-5** as well as plaintiff testimony form the basis of opinions.

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Table 6-1: Summary of Gates Closed Enhanced 2D HEC-RAS Model

	Modeled Gates Closed Scenario	Gates Opened Observed Conditions
Addicks Peak Pool Level (ft)	110.26	109.09
Barker Peak Pool Level (ft)	103.96	101.56
Addicks Peak Gate Outflow (cfs)	0	6,440 ^a
Barker Peak Gate Outflow (cfs)	0	4,990 ^a
Addicks Peak Flanking Flow (cfs)	5,710	~2,000 ^b
Barker Peak Flanking Flow (cfs)	0	0
Addicks Timing of Peak Flanking Flow (cfs)	3:45 am on 31 August 2017	7:00 am on 30 August 2017

Notes: ^a The calculated gate outflow rates are based on tailwater conditions reported in the USACE “morning report” spreadsheet; actual gate outflow rates may have been higher according to USGS gauge measurements.

^b The reported flanking flow rate is based on Kauffman deposition.

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Table 6-2: Summary of Enhanced 2D HEC-RAS Model Flanking Flow Results

Inflow Location	Peak Return Flanking Flow for Gates Opened Scenario (cfs)	Peak Return Flanking Flow for Gates Closed Scenario (cfs)
Turkey Creek	955	1,916
Rummel Creek	10	829
Spring Branch	173	1,231
White Oak Bayou	457	1,438

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Table 6-3: Summary of Combined 1D HEC-RAS Model Results – Test Properties

Location	Slab Elevation (ft)	Modeled Gates Opened Peak WSE (ft)	Modeled Gates Closed Peak WSE (ft)	Modeled Gates Open Peak Flow (cfs)	Modeled Gates Closed Peak Flow (cfs)
#1 Milton	78.61	82.78	79.42	4,965	3,797
#2 Shipos	80.90	82.53	79.09	4998	3,709
#3 Memorial SMC ^a	77.00 to 77.90	82.48	79.01	5,016	3,787
#4 Good Resources ^a	78.50	82.43	78.92	5,046	3,933
#5 Aldred	80.20	82.13	78.79	12,133	4,635
#6 Hollis	76.50	80.80	77.38	13,106	8,749
#7 Silverman	75.09	77.81	74.56	13,025	8,299
#8 Godejord	74.00	77.29	74.10	12,994	8,223
#9 Cutts	72.00	72.13	69.79	12,600	8,546
#10 Beyoglu	70.10	67.17	65.96	12,537	10,014
#11 Azar	48.94	55.91	55.91	12,502	11,845
#12 Stahl	52.10	52.22	52.22	17,502	17,502
#13 Welling	39.40	41.87	41.87	20,372	20,372

Notes: ^a #3 Memorial SMC and #4 Good Resources are located along Langham Creek downstream from the Addicks Reservoir outlet structure which is a tributary to Buffalo Bayou. The 1D HEC-RAS model represents Buffalo Bayou and does not include a Langham Creek reach. Therefore, the modeled peak WSE and flows are based on Buffalo Bayou conditions.

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Table 6-4: Summary of Downstream Test Property Inundation Depths

Downstream Test Property	Slab Elevation (ft)	Estimate of Maximum Observed Inundation (ft)	Modeled Gates Opened Peak Inundation (ft)	Modeled Gates Closed Peak Inundation (ft)	Difference Between Gates Opened and Gates Closed WSE (ft)
#1 Milton	78.61	4.33	4.17	0.81	3.36
#2 Shipos	80.90	1.25	1.63	0.00	3.44
#3 Memorial SMC	77.00 to 77.90	5.50 to 6.00	5.48	2.01	3.48
#4 Good Resources	78.50	3.33	3.93	0.42	3.51
#5 Aldred	80.20	1.50	1.93	0.00	3.34
#6 Hollis	76.50	3.75	4.30	0.88	3.42
#7 Silverman	75.09	1.50	2.72	0.00	3.25
#8 Godejord	74.00	2.83	3.29	0.10	3.19
#9 Cutts	72.00	0.67	0.13	0.00	2.34
#10 Beyoglu	70.10	4.00	0.00	0.00	1.21
#11 Azar	48.94	9.75	6.97	6.97	0.00
#12 Stahl	52.10	3.33	0.12	0.12	0.00
#13 Welling	39.40	10.00	2.47	2.47	0.00

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Table 6-5: Summary of Downstream Test Property Inundation Durations

Downstream Test Property	Reported Inundation Duration (days)	Modeled Gates Closed Peak WSE (ft)	Duration of Gates Opened WSE Greater Than Gates Closed Peak WSE (days)
#1 Milton	12.9	79.42	13.4
#2 Shipos	6.0	79.09	13.4
#3 Memorial SMC	14.0	79.01	13.5
#4 Good Resources	12.5	78.92	13.5
#5 Aldred	3.0	78.79	12.8
#6 Hollis	12.0	77.38	13.2
#7 Silverman	10.0	74.56	13.2
#8 Godejord	10.0	74.10	13.2
#9 Cutts	7.9	69.79	9.6
#10 Beyoglu	10.0	65.96	5.3
#11 Azar	16.0	N/A	12.1 ^a
#12 Stahl ^b	1.0	N/A	N/A
#13 Welling ^b	4.0	N/A	N/A

Notes: ^a The “Duration of Gates Opened WSE Greater Than Gates Closed Peak WSE (days)” for #12 Azar was calculated as the duration from when the gates closed WSE receded below the slab elevation to the time when the gates opened WSE receded below the slab elevation.

^b Although the gates opened scenario inundation duration is expected to be longer than the gates closed scenario for properties #12 Stahl and #13 Welling, the longer duration is dependent on the selected elevation. In general, Figures 6-5L and 6-5M show an increase in the inundation duration on the order of up to twelve days depending on the selected elevation.

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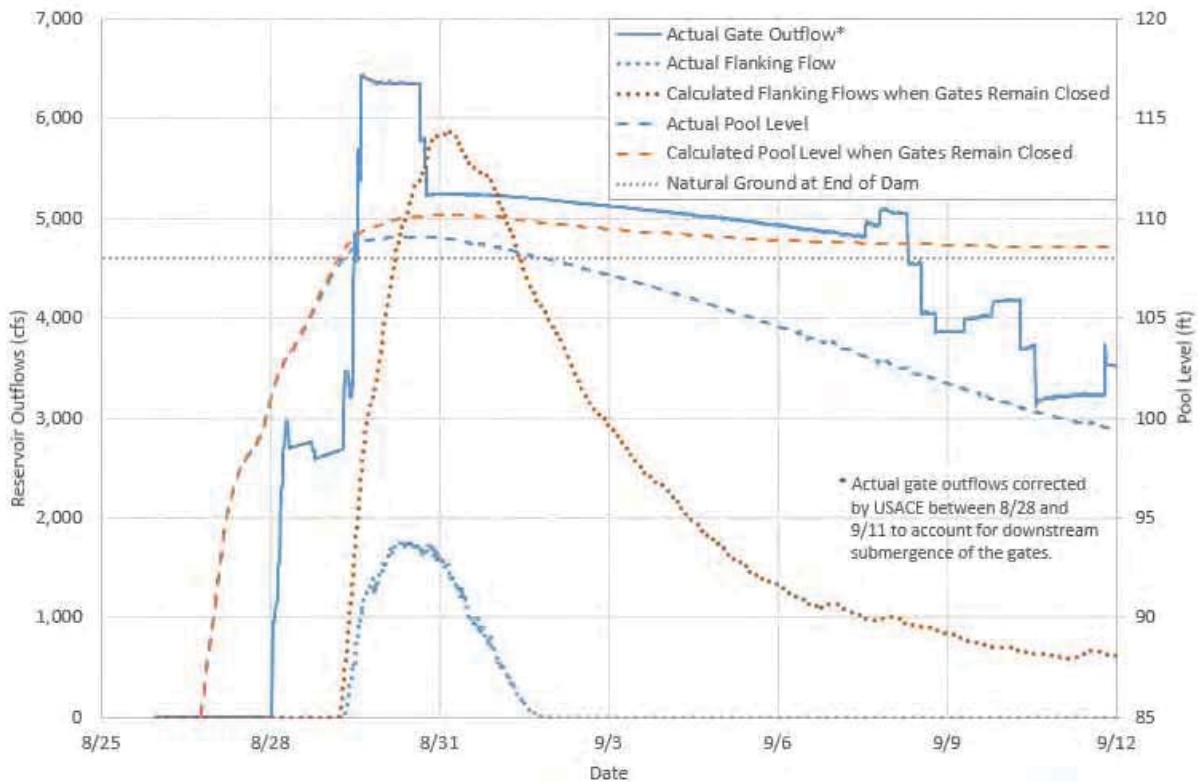


Figure 6-1: Observed and Simulated Outflows and Pool Levels at Addicks Reservoir

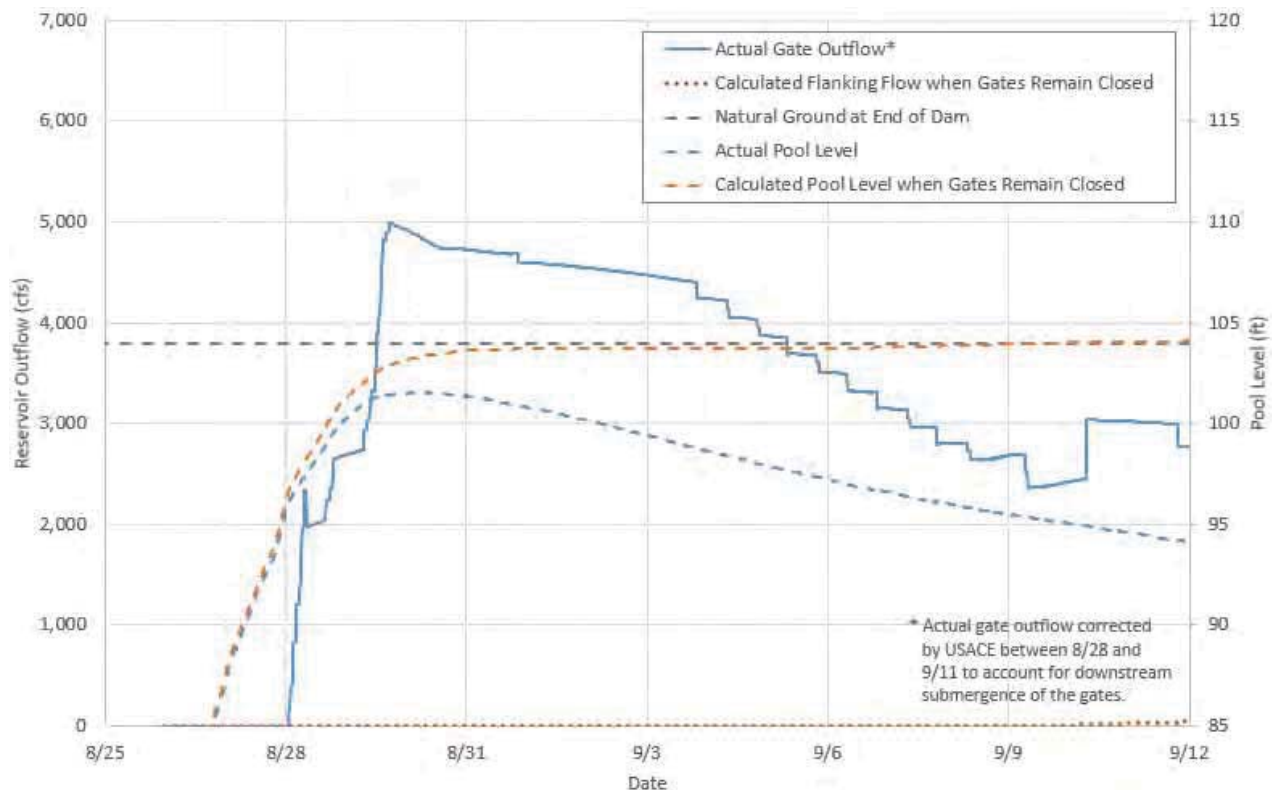
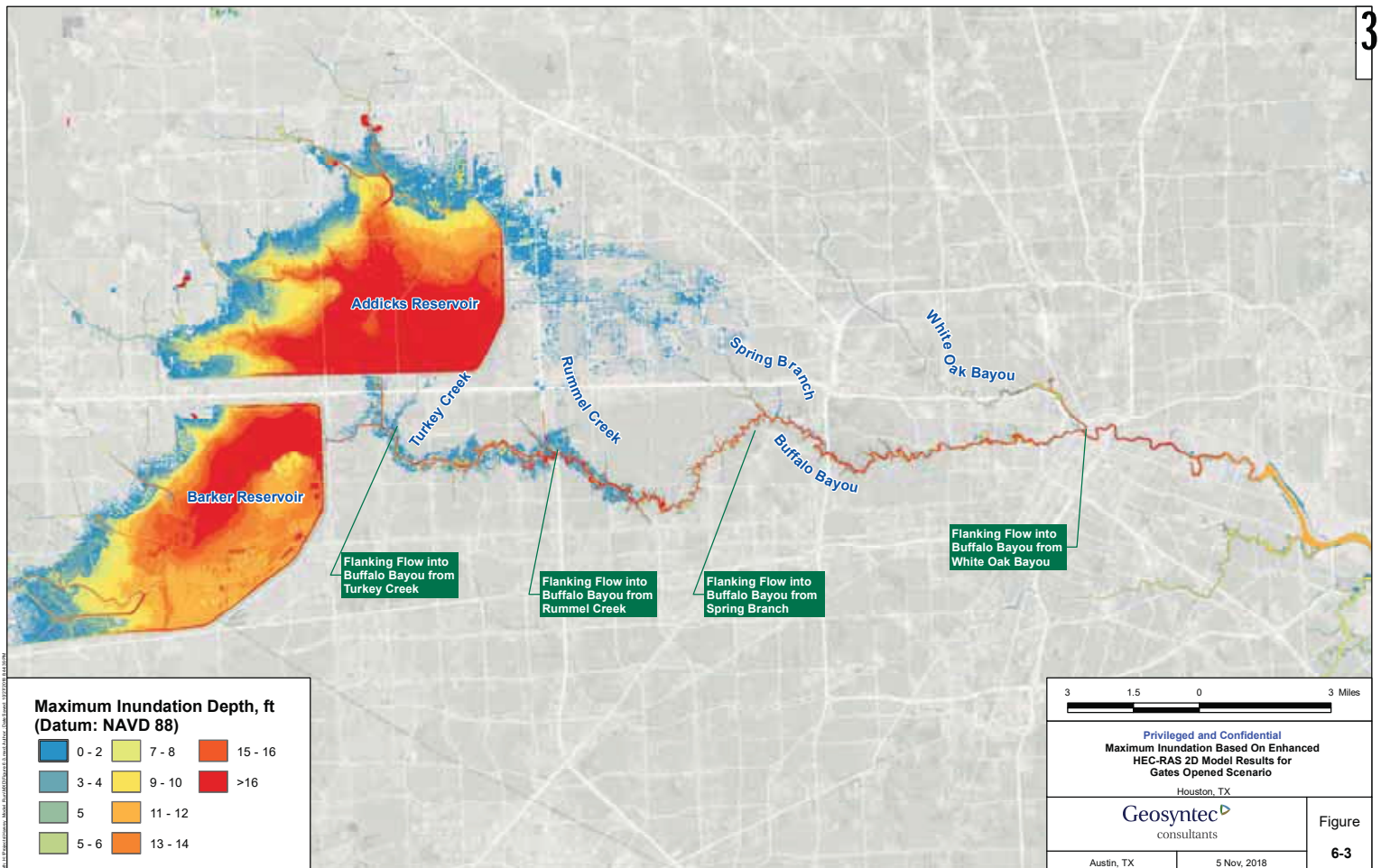
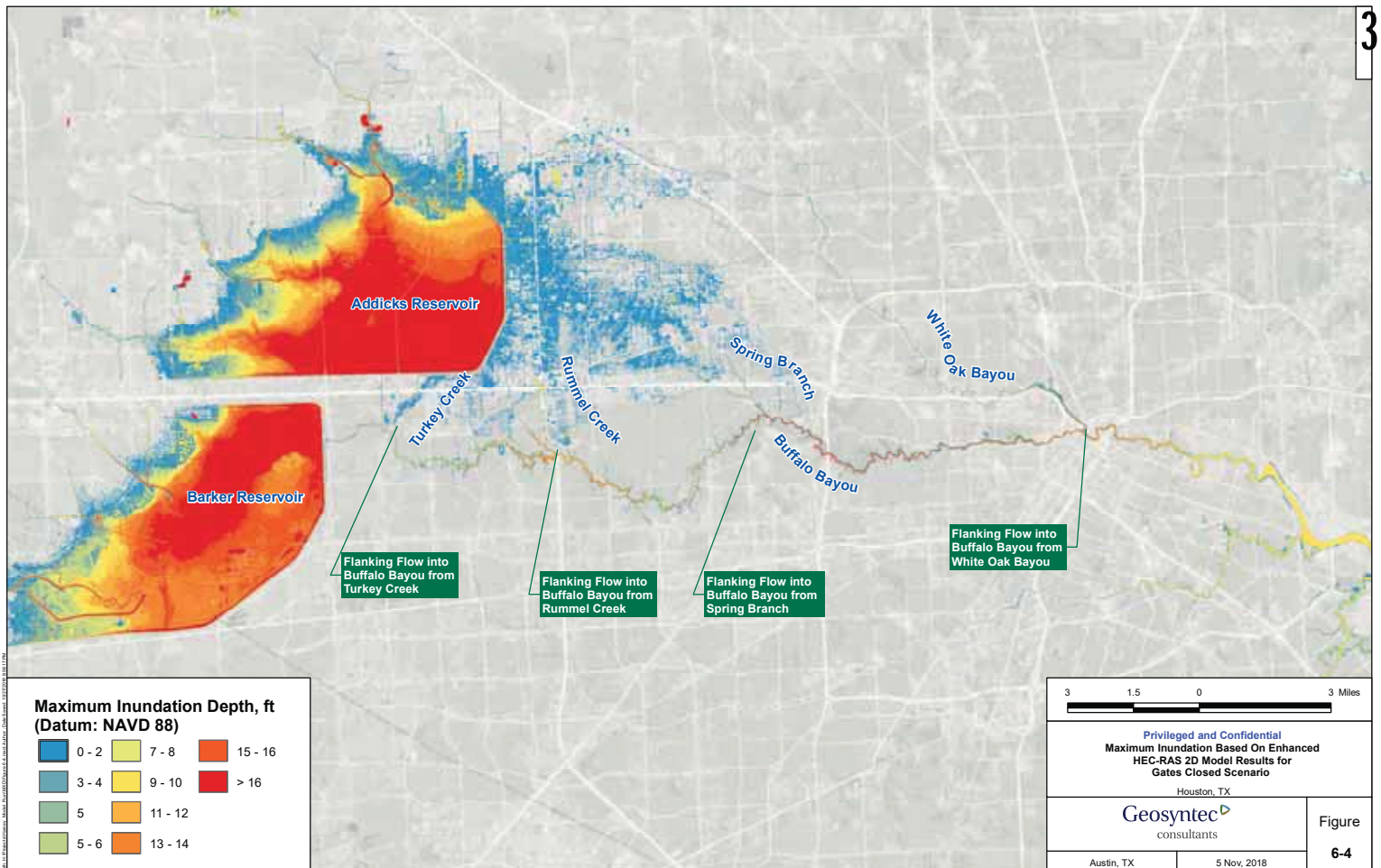


Figure 6-2: Observed and Simulated Outflows and Pool Levels at Barker Reservoir

3



3



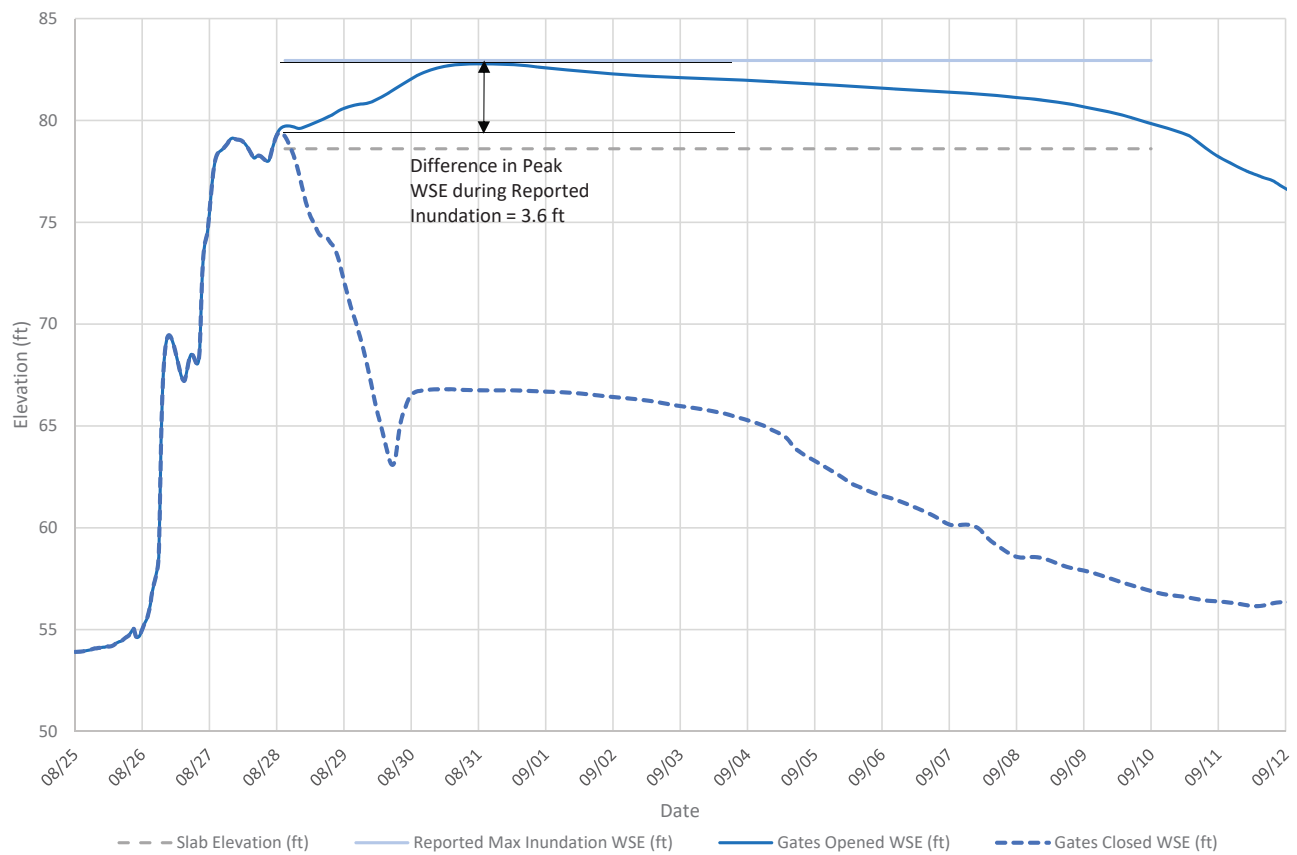


Figure 6-5A: Elevation Hydrograph for #1 Milton

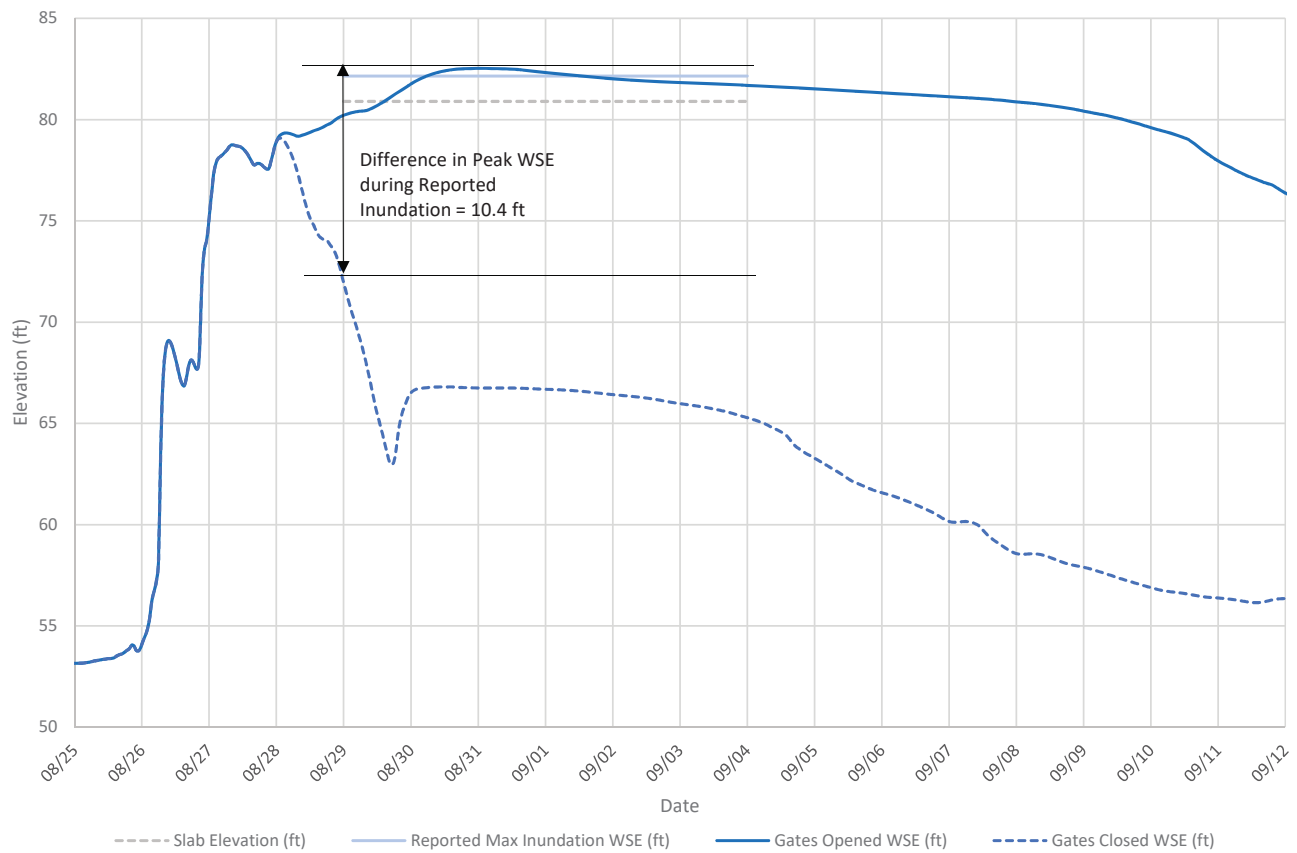


Figure 6-5B: Elevation Hydrograph for #2 Shipos

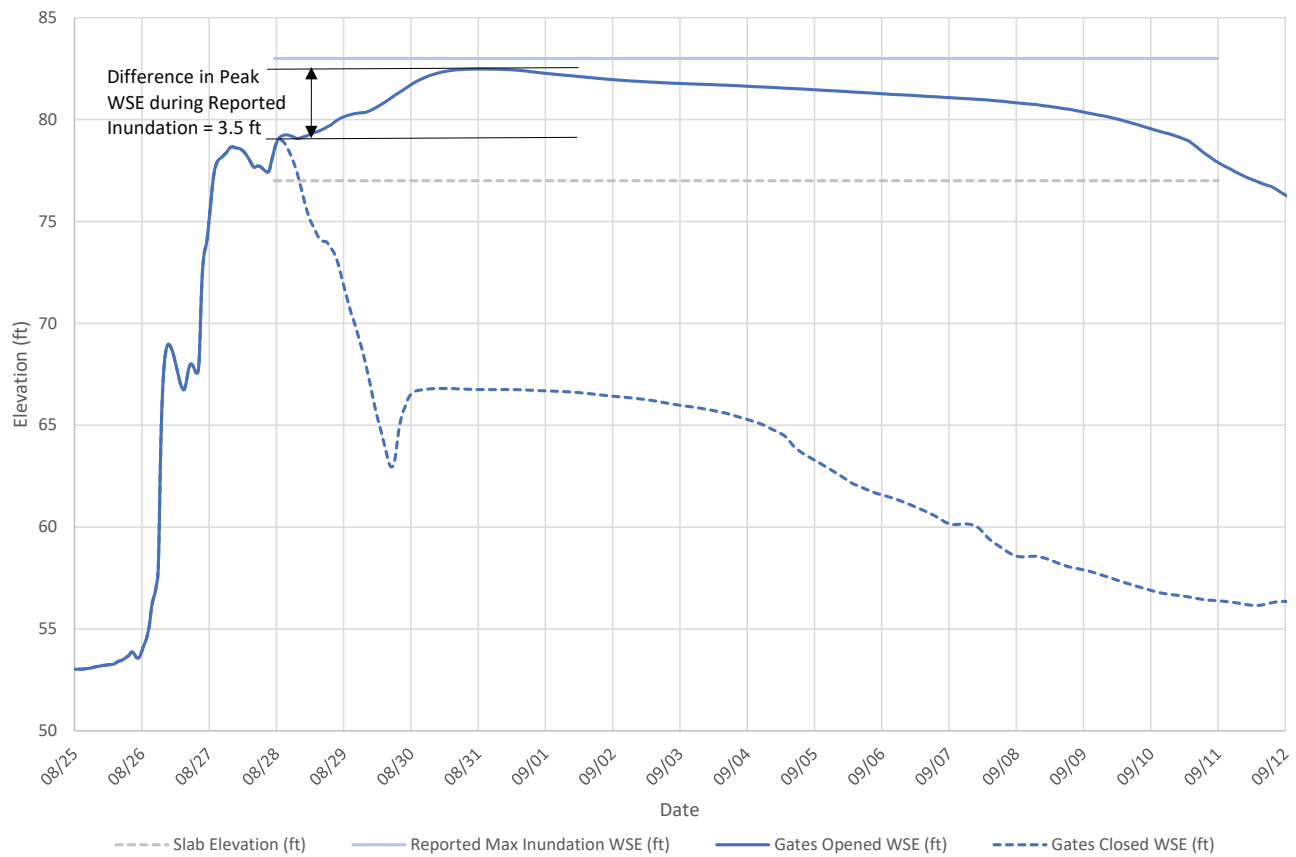


Figure 6-5C: Elevation Hydrograph for #3 Memorial SMC

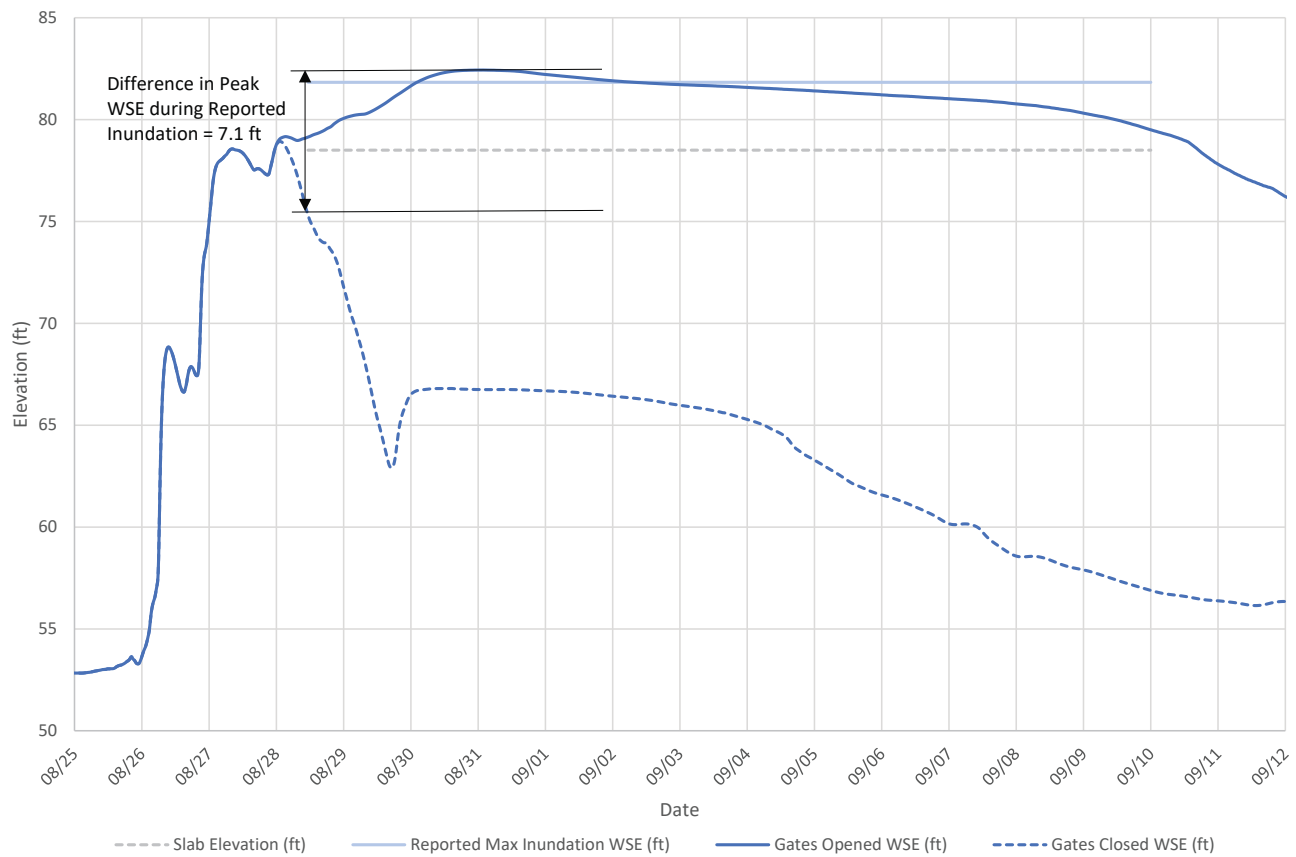


Figure 6-5D: Elevation Hydrograph for #4 Good Resources

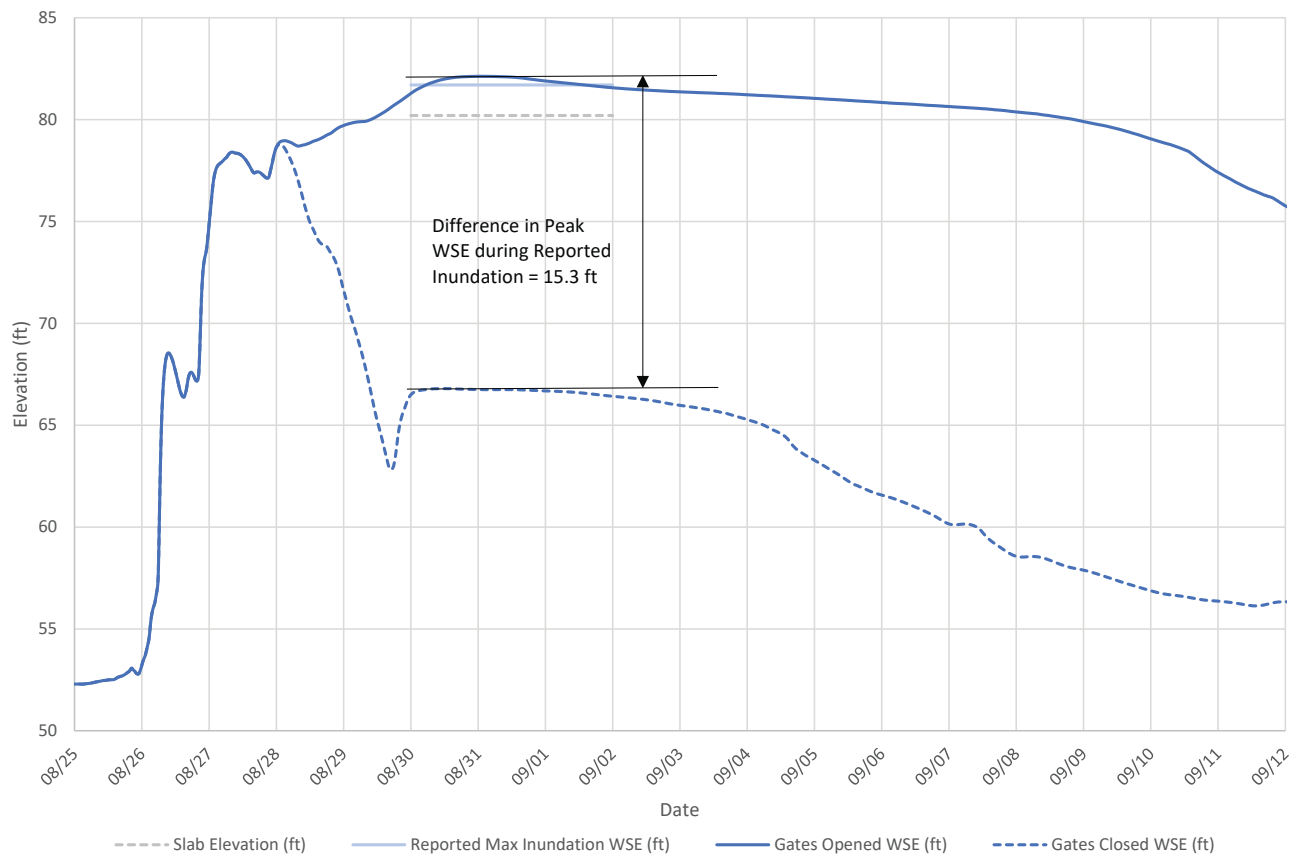


Figure 6-5E: Elevation Hydrograph for #5 Aldred

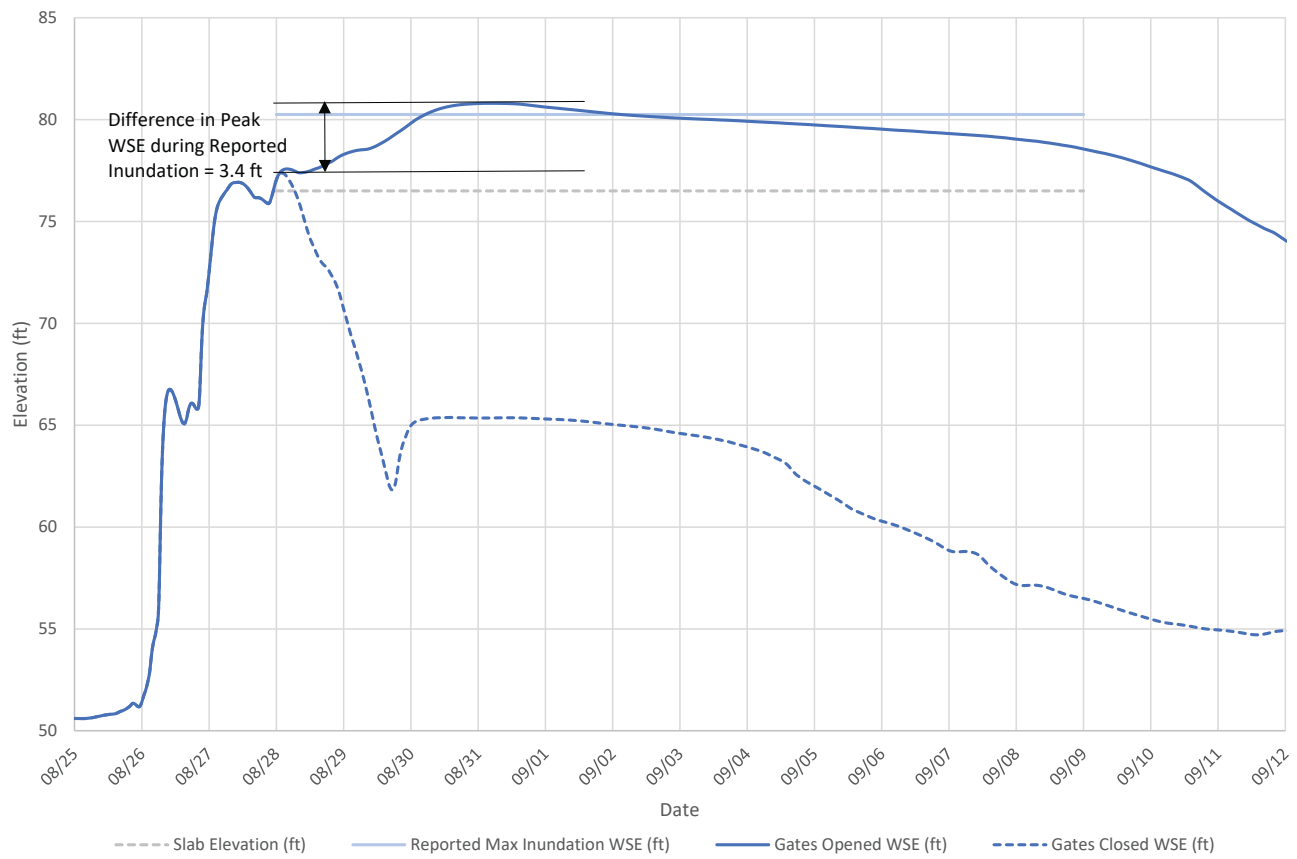


Figure 6-5F: Elevation Hydrograph for #6 Hollis

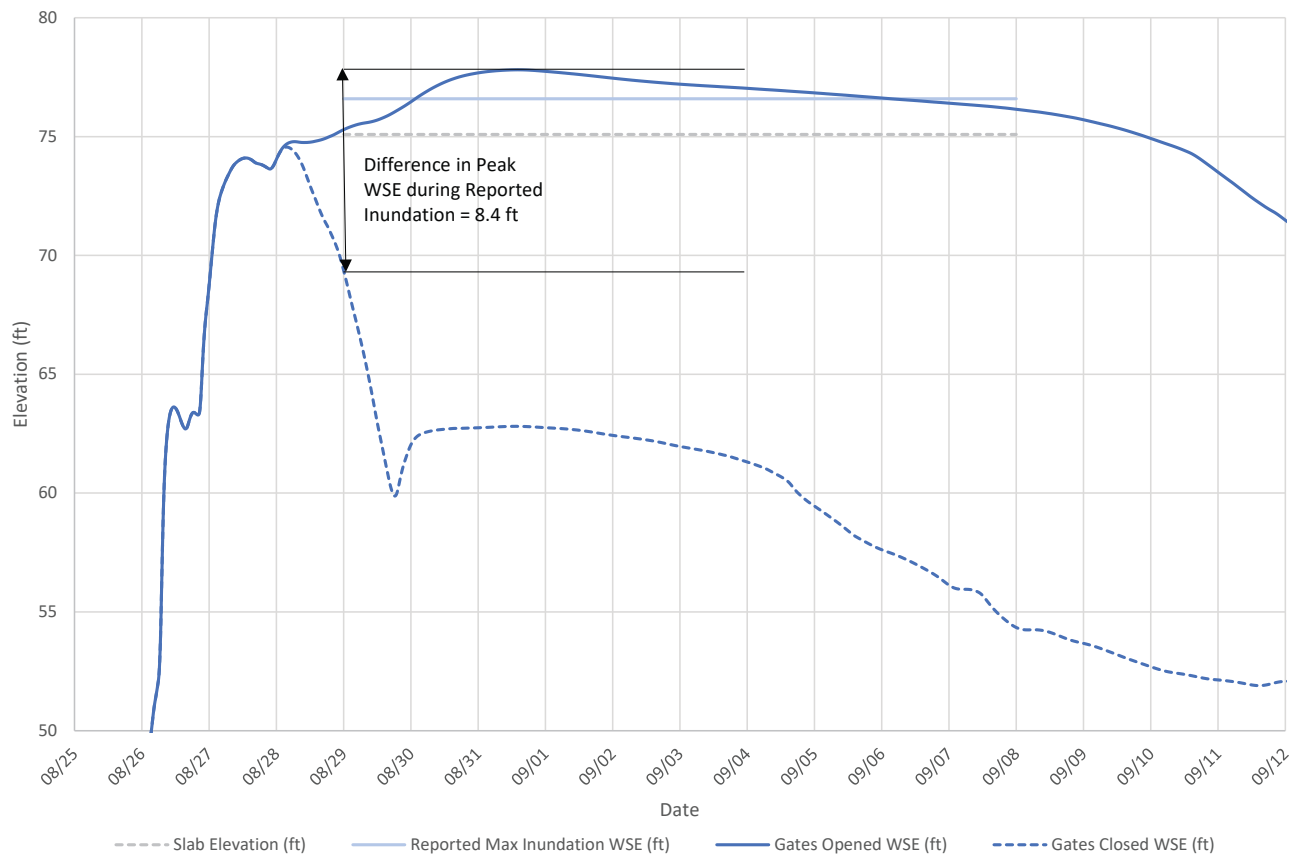


Figure 6-5G: Elevation Hydrograph for #7 Silverman

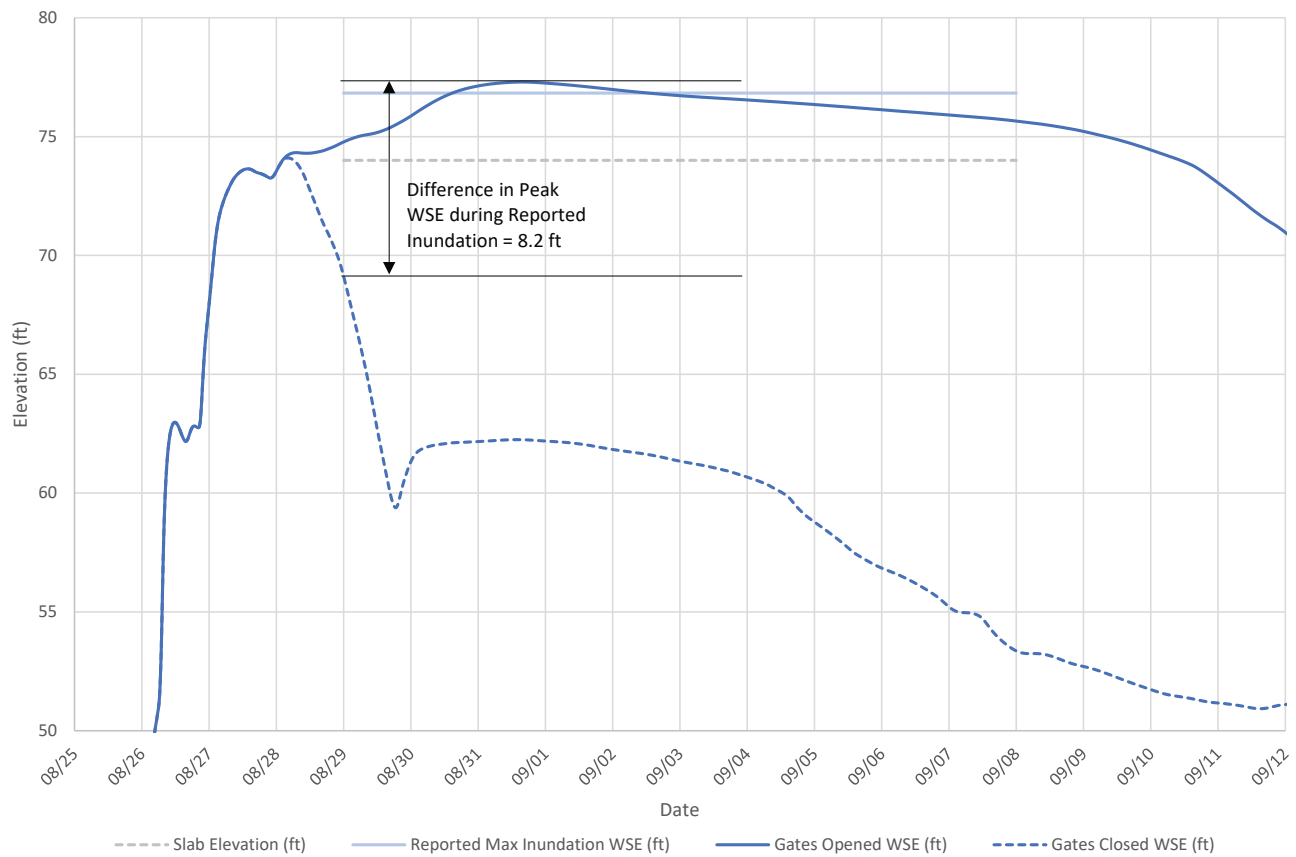


Figure 6-5H: Elevation Hydrograph for #8 Godejord

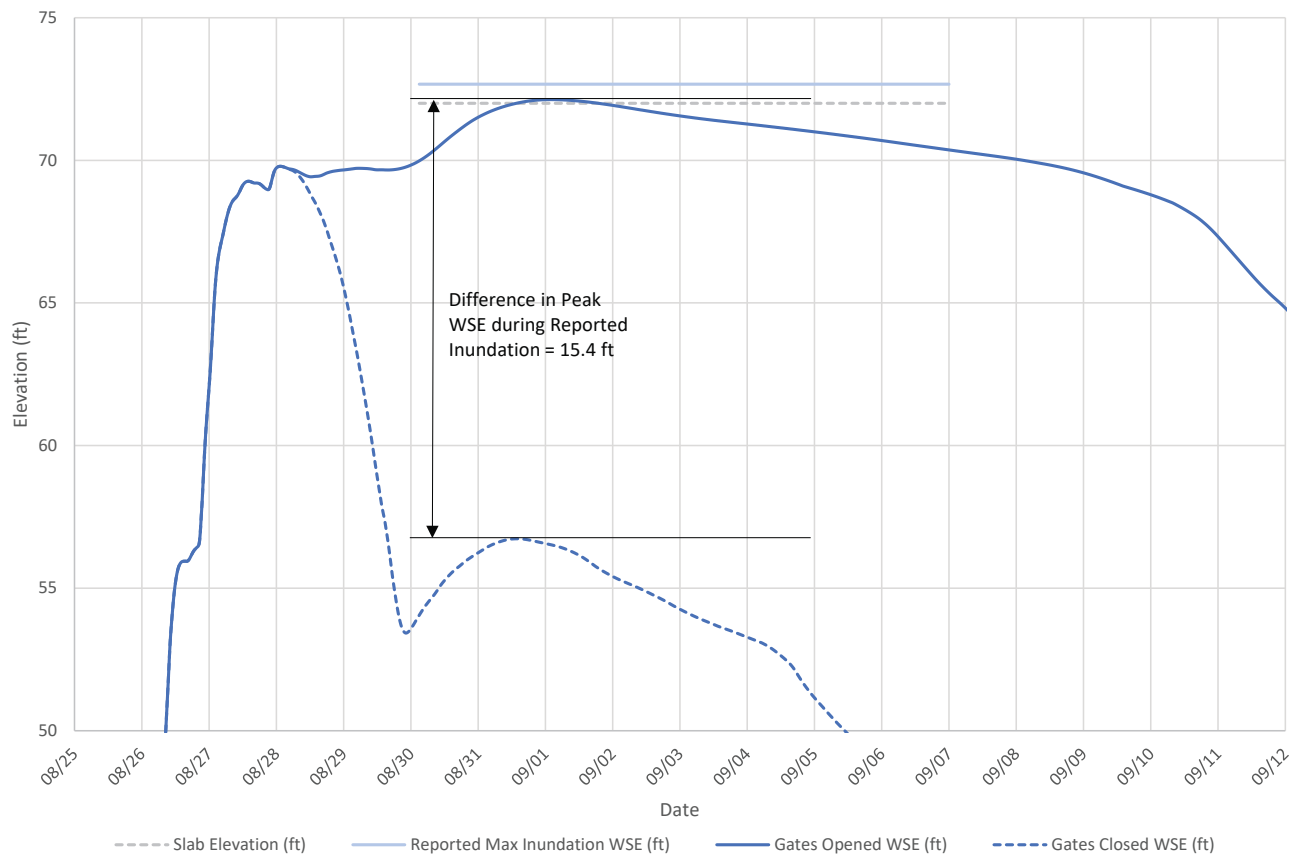


Figure 6-5I: Elevation Hydrograph for #9 Cutts

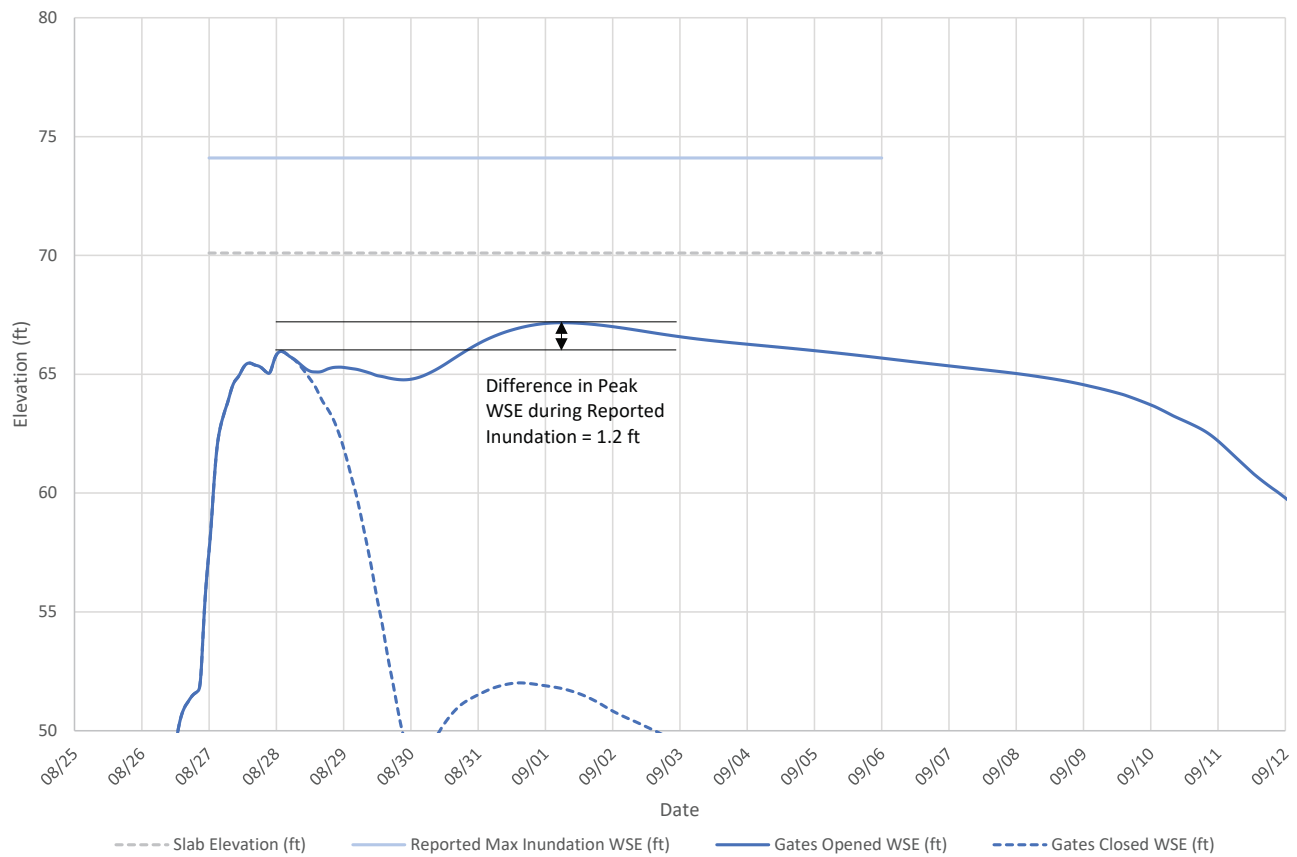


Figure 6-5J: Elevation Hydrograph for #10 Beyoglu

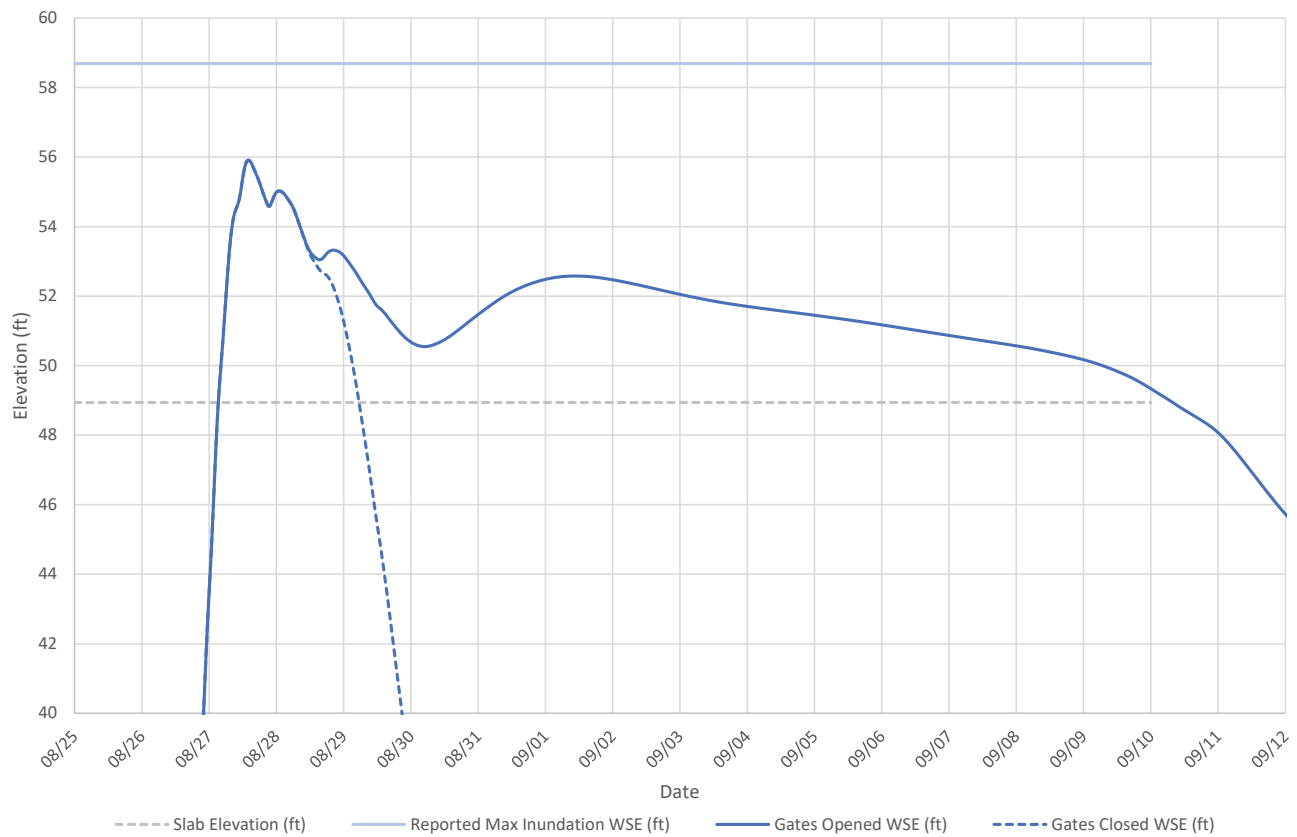


Figure 6-5K: Elevation Hydrograph for #11 Azar

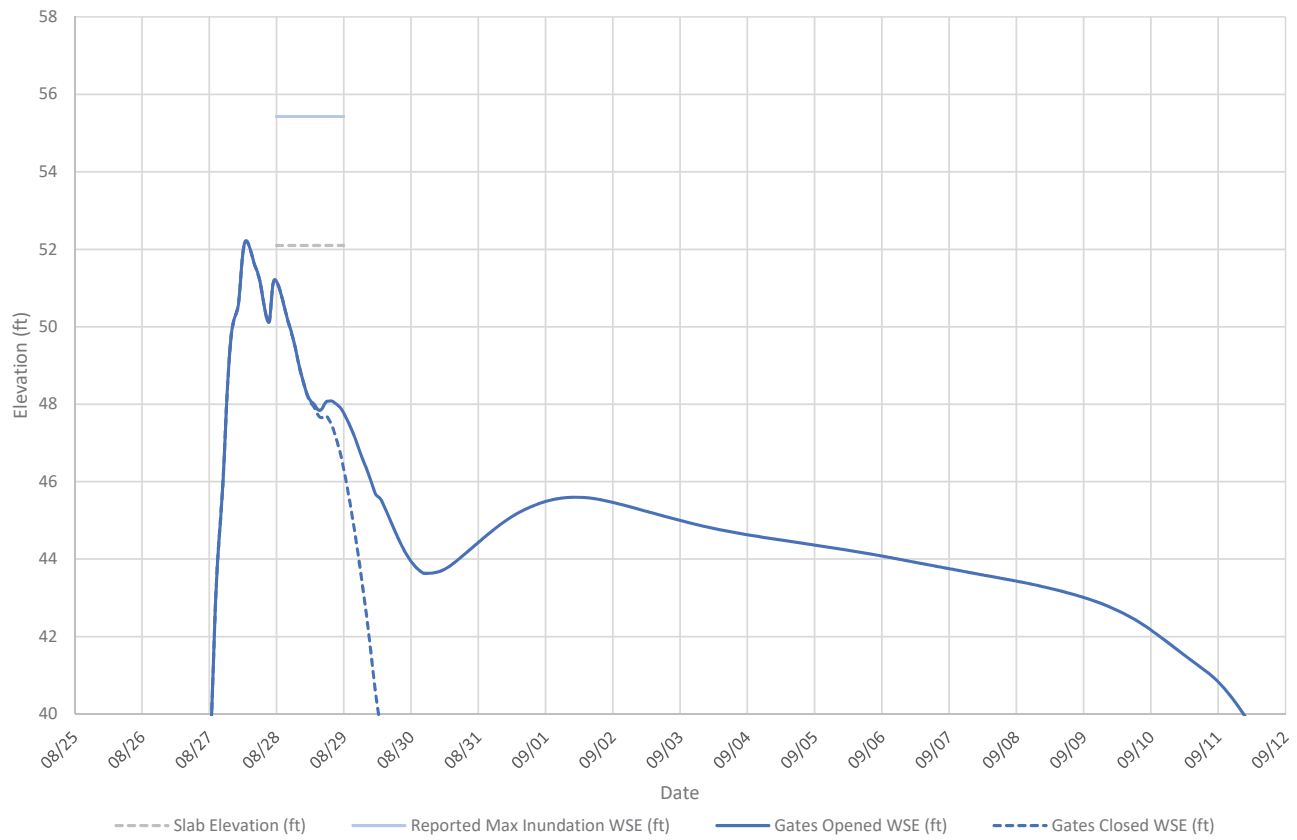


Figure 6-5L: Elevation Hydrograph for #12 Stahl

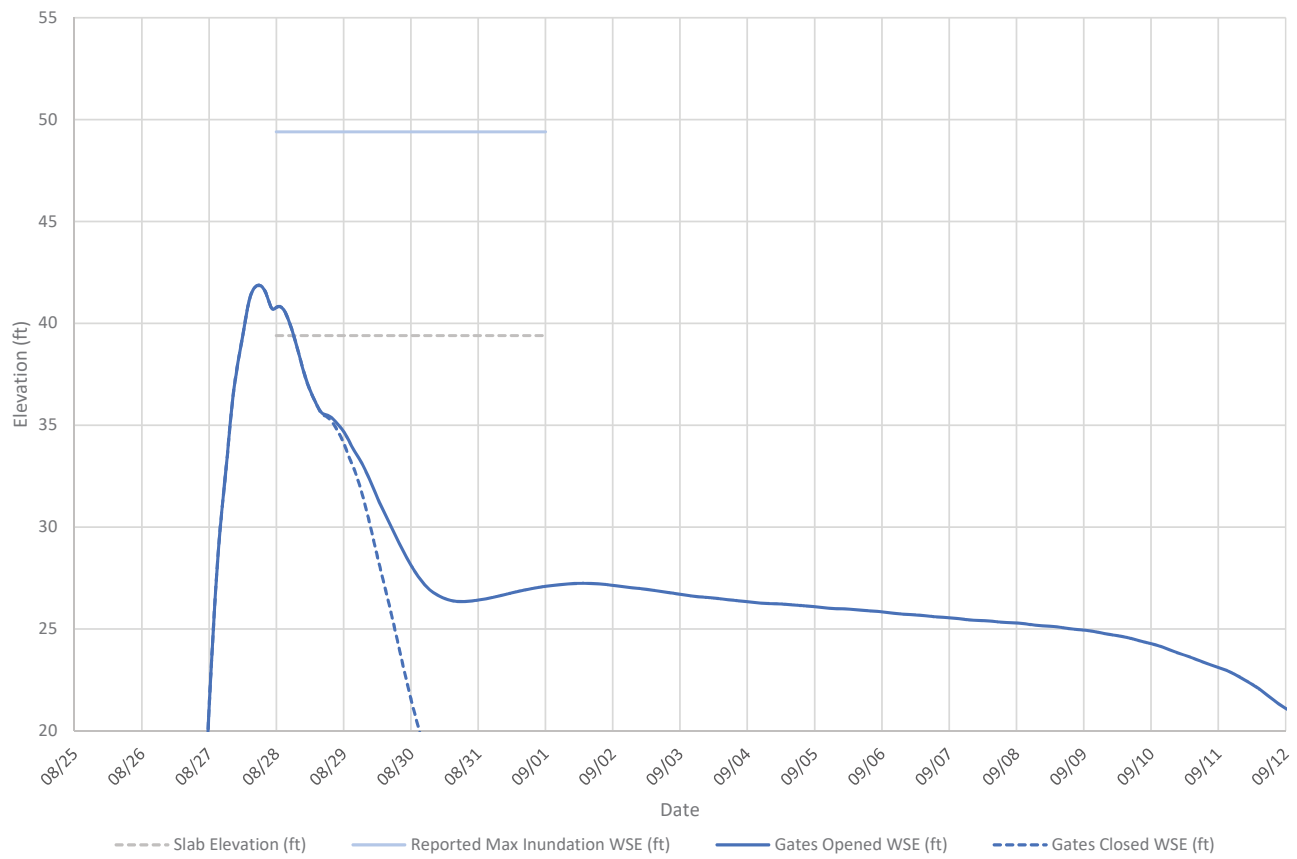


Figure 6-5M: Elevation Hydrograph for #13 Welling

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SECTION 7

INITIAL OPINIONS ON PROPERTY INUNDATION

7.1 Opinion 1: Effect of Opening the Gates

The gates opened scenario based on the actual gate openings in general accordance with the 2012 WCM was compared to the gates closed scenario. Utilizing estimated inflow rates into the reservoirs, calculated storage volumes behind the dams, and calculated outflow rates (from either the gate openings or the dam flanking flows), the pool levels and flanking flows were investigated. Hydraulic modeling results comparing the gates opened and gates closed model scenarios are presented in **Table 6-4** and **Figure 6-5**. The opinions presented below were formulated using these model results, deposition testimony, and the additional information presented in this report.

In my opinion, the USACE's decision to open the gates in general accordance with the 2012 WCM significantly increased downstream flows within Buffalo Bayou during Hurricane Harvey. Based on the hydraulic model results and deposition testimony, the 13 downstream test properties were adversely impacted as a result of the USACE's decision to implement the induced surcharge operation schedule according to the 2012 WCM.

The resulting impact was to cause additional inundation to downstream properties along Buffalo Bayou, including the 13 downstream test properties.

7.2 Opinion 2: Inundation of Properties in Zone 1

7.2.1 Property 1 – Milton

The property located at 850 Silvergate Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 4.33 ft of water above the building slab elevation of 78.61 ft beginning approximately 3:00 am on 28 August 2017 and lasting until approximately 10 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.78 ft. The gates closed model scenario results in a modeled water surface elevation of 79.42 ft.

The plaintiff reported that inundation of the property did not occur until after 3:00 am on 28 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.81 ft (9.7 in) prior to gates opening; however, this is within the model's uncertainty for this location. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. **In considering the plaintiff's testimony and the results of the model, it is my opinion that the plaintiff's reported inundation depth and associated damage to the property**

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was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.

7.2.2 Property 2 – Shipos

The property located at 931 Bayou Parkway was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 1.25 ft of water above the building slab elevation of 80.90 ft beginning on or about 29 August 2017 and lasting until approximately 4 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.53 ft. The gates closed model scenario results in a modeled water surface elevation of 79.09 ft.

The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the modeling, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.2.3 Property 3 – Memorial SMC

The property located at 777 S. Mayde Creek Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was initially inundated beginning late on the night of 27 August 2017 with approximately 6 to 8 inches of water. A maximum inundation depth of 5.5 to 6.0 ft of water above the building slab elevations that range from 77.0 ft to 77.9 ft, with inundation lasting until 11 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.48 ft. The gates closed model scenario results in a modeled water surface elevation of 79.01 ft.

The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 12 to 20 inches prior to gates opening; however, this is within the model's uncertainty for this location. Based on the plaintiff's testimony regarding observed inundation depth, it is reasonable that the property would have had a lower inundation depth prior to the gates opening, and the model results are reasonably consistent with observed conditions. In addition to the model results showing a distinct rise in the water surface elevation after the gates were opened, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. **It is my opinion that a substantial increase in inundation depth (on the order of 3.5 to 5.5 ft) above the plaintiff's observed inundation depth on the far northeast corner of the property late in the evening of 27 August 2017, and that a substantial increase in duration of inundation (on the**

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order of 13 days) from a modeled duration of less than one day under the gates closed scenario, was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM, and that such additional inundation and associated damage to the property would not have occurred if the gates had remained closed.

7.2.4 Property 4 – Good Resources

The property located at 760 Memorial Mews Street #4 was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 3.33 ft of water above the building slab elevation of 78.50 ft beginning approximately 11:19 am on 28 August 2017 and lasting until approximately 10 September 2017. The gates opened model scenario results indicates a modeled water surface elevation of 82.43 ft. The gates closed model scenario indicates a modeled water surface elevation of 78.92 ft.

The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario with approximately 3.5 ft of inundation, consistent with the testimony. The plaintiff reported that inundation of the property did not occur until after 11:00 am on 28 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.42 ft (5.0 in) prior to gates opening; however, this is within the model's uncertainty for this location. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's property would not have been inundated under a gates closed scenario and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.3 Opinion 3: Inundation of Properties in Zone 2

7.3.1 Property 5 – Aldred

The property located at 835 Thornvine Lane was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 1.5 ft of water above the building slab elevation of 80.20 ft beginning on approximately 30 August 2017 and lasting until approximately 2 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.13 ft. The gates closed model scenario results in a modeled water surface elevation of 78.79 ft.

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The 1D HEC-RAS model results show the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.3.2 Property 6 – Hollis

The property located at 14914 River Forest Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 3.75 ft of water above the building slab elevation of 76.50 ft beginning on approximately 28 August 2017 and lasting until approximately 9 September 2017. The gates opened model scenario results in a modeled water surface elevation of 80.80 ft. The gates closed model scenario results in a modeled water surface elevation of 77.38 ft.

The plaintiff reported that inundation of the property did not occur until 28 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.88 ft (10.6 in) prior to gates opening; however, this is within the model's uncertainty for this location. Based on the plaintiff's testimony regarding observed inundation depth, it is reasonable that the property would not have flooded prior to the gates opening, and the model results are reasonably consistent with observed conditions. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.4 Opinion 4: Inundation of Properties in Zone 3

7.4.1 Property 7 – Silverman

The property located at 12515 Westerley Lane was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 1.5 ft of water above the building slab elevation of 75.09 ft beginning on approximately 29 August 2017 and lasting until approximately 8 September 2017. The gates opened model scenario results in a modeled water surface elevation of 77.81 ft. The gates closed model scenario results in a modeled water surface elevation of 74.56 ft.

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The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.4.2 Property 8 – Godejord

The property located at 14334 Heatherfield Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 2.83 ft of water above the building slab elevation of 74.00 ft beginning on approximately 29 August 2017 and lasting until approximately 8 September 2017. The gates opened model scenario results in a modeled water surface elevation of 77.29 ft. The gates closed model scenario results in a modeled water surface elevation of 74.10 ft.

The plaintiff reported that inundation of the property did not occur until 29 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.10 ft (1.2 in) prior to gates opening; however, this is within the model's uncertainty for this location. Based on the plaintiff's testimony regarding observed inundation depth, it is reasonable that the property would not have flooded prior to the gates opening, and the model results are consistent with observed conditions. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.5 Opinion 5: Inundation of Properties in Zone 4

7.5.1 Property 9 – Cutts

The property located at 311 Blue Willow Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 0.67 ft of water above the building slab elevation of 72.00 ft beginning around 3:00 am on 30 August 2017 and lasting until approximately 7 September 2017. The gates opened model scenario results in a modeled water surface elevation of 72.13 ft. The gates closed model scenario results in a modeled water surface elevation of 69.79 ft.

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The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed despite the model results over estimating the WSE at the property.**

7.6 Opinion 6: Inundation of Properties in Zone 5

7.6.1 Property 10 – Beyoglu

The property located at 107 Warrenton Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 4.0 ft of water above the building slab elevation of 70.10 ft beginning on 27 August 2017 with approximately 2.0 ft of inundation and rising to 4.0 ft on 29 August 2017 and lasting until approximately 5 September 2017. The gates opened model scenario results in a modeled water surface elevation of 67.17 ft. The gates closed model scenario results in a modeled water surface elevation of 65.96 ft.

The plaintiff reported that inundation of the property occurred on 27 August 2017, which was before the gates were opened under the induced surcharge protocol, but this inundation depth increased by an additional 2.0 ft on 29 August 2017, after the gates were opened. The 1D HEC-RAS model indicates a water surface elevation under both scenarios below the reported slab elevation. At this distance downstream from the reservoirs along Buffalo Bayou, the model is consistently under predicting the observed water surface elevations. However, the model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model results of WSE after this time indicates a peak difference in WSE between the two scenarios of 1.2 ft. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and timing is attributable to the difference in WSE between the two scenarios after the reported start of inundation; as result, the inundation of and associated damage to the property is attributed to the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM despite the model results under estimating the WSE at the property.**

7.7 Opinion 7: Inundation of Properties in Zone 6

7.7.1 Property 11 – Azar

The property located at 3 Magnolia Bend Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony. The plaintiff

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testified that inundation of the property began on 25 August 2017 but was limited to the garage until 28 August 2017 when the entire first floor of the property was inundated. The plaintiff testified that the maximum inundation on the property was up to 9.75 ft (i.e., 117 inches) of water above the building slab elevation of 48.94 ft and lasting until approximately 8 September 2017.

At this location downstream of the reservoirs, the gates opened and gates closed model scenarios indicate very similar peak flow rates within Buffalo Bayou and modeled water surface elevations of approximately 55.91 ft. However, the model shows a very distinct difference in the sustained flow rate within Buffalo Bayou when comparing the gates opened and gates closed scenarios. The modeled gates opened flow hydrograph at this location matches the recorded gauge flow hydrograph very well. When the modeled gates closed flow hydrograph is compared to the recorded flows at the Piney Point gauge (see **Figure B-9** for hydrographs at USGS 08073700 in **Appendix B**), a distinct decrease in the sustained flow rate is very pronounced. The gates closed flow rate drops from nearly 11,000 cfs to approximately 2,000 cfs in less than two days. The gates opened hydrograph shows the prolonged and sustained flow rates at elevated flood levels for a much longer duration when compared to the gates closed scenario.

In considering the plaintiff testimony and general trends of the modeling, **it is my opinion that a substantial increase in duration of inundation (on the order of 12 days) from a modeled duration of approximately 48 hours under the gates closed scenario, was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM, and that such additional inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.7.2 Property 12 – Stahl

The property located at 265 Chimney Rock Road was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony. The plaintiff testified that the property was inundated with up to 3.33 ft of water above the building slab elevation of 52.10 ft.

Downstream of the Piney Point gauge (USGS 08073700), the 1D HEC-RAS model appears to under estimate the peak flow and water surface elevation as compared to reported values by the USGS gauge. Due to the lack of direct observations of flood inundation by the plaintiff, a thorough calibration of the model at this location was not feasible. Without the support of direct observations of the flood inundation of the property, I am unable to present an informed opinion of the full cause or duration of the inundation attributed to the induced surcharge releases.

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7.8 Opinion 8: Inundation of Properties in Zone 7

7.8.1 Property 13 – Welling

The property located at 5731 Logan Lane was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony. In addition, Dutch Lindeburg (2018) testified that inundation of the property began on 28 August 2017, with an observed depth of approximately 3 ft above the first floor slab elevation of 47.40 ft. Mr. Lindeburg's testimony reported an additional 1.5 ft of inundation (with a total depth of approximately 4.5 ft) occurred by 2:00 am 29 August 2017. The 1D HEC-RAS model does not adequately predict the significant flows within the channel at this point; however, the USGS gauge 08074000 Buffalo Bayou at Houston is in close proximity to the property to provide recorded flow data.

In considering the plaintiff testimony and general trends of the USGS gauge, **it is my opinion that the observed increase in inundation on 29 August 2017 could reasonably be the result of the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM on 28 August 2017.**

7.9 Summary of Conclusions

During and after Hurricane Harvey, Addicks and Barker Reservoirs were operated in a manner that caused downstream flooding as a result of induced surcharge operations. Induced surcharge operations had the effect of mitigating upstream inundation, to the detriment of downstream properties, which experienced inundation that otherwise would not have occurred. At the time of Hurricane Harvey, USACE knew – with specificity to streets, blocks, or intersections – the downstream impact of its decision to release water from Addicks and Barker Reservoirs pursuant to the 2012 WCM's induced surcharge procedures. As explained in this Report, action undertaken by USACE to open the Addicks and Barker gates was the decision that caused the downstream test properties to be inundated, and those properties would not have been inundated, and/or would not have been inundated to the extent experienced during and after Hurricane Harvey, but for the induced surcharge release⁵. This decision to abandon from the long-standing policy of protecting downstream properties increased the duration and depth of inundation.

⁵ No conclusions can be reached to a reasonable degree of scientific and engineering probability with respect to downstream test property #12 Stahl.

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SECTION 8

INITIAL OPINION ON ADDICKS AND BARKER SPILLWAY AND OUTLET WORKS

Geosyntec participated in a one-day duration site visit to the Addicks and Barker Reservoirs hosted by representatives of USACE. At the time of the site visit, work was progressing on the new outlet structures at both dam sites. The purpose of the site visit was to observe first-hand the condition of the dams and specifically the current conditions at the north end of Addicks Dam. This area was subjected to local overtopping and flood waters flowed around the end of the reservoir containment system. Prior to and after the site visit, Geosyntec reviewed numerous documents related to: (i) historical concerns published by USACE regarding safety of the two dams and outlet works, (ii) historical rehabilitation measures for the dams and outlet works, (iii) current rehabilitation efforts at the outlet works; (iv) the 1962 RRM and 2012 WCM; and (v) performance of the dams during Hurricane Harvey. Based on review of these documents, Geosyntec has developed the following observations:

- Hurricane Harvey resulted in pool levels of 109.09 ft (Addicks) and 101.56 ft (Barker). These pool levels were well within the design conditions of the reservoirs.
- The 2012 WCM allowed the gates to be opened resulting in significant releases of flood waters to Buffalo Bayou.
- The actions taken by USACE followed the 2012 WCM in that the gates were opened when pool levels in the reservoir reached elevation 101.0 ft (Addicks) and 95.7 ft (Barker). Furthermore, Geosyntec concurs that the USACE response to inspections and assessments during Hurricane Harvey were appropriate.

These observations notwithstanding, the operations of the outlet works during Hurricane Harvey in accordance with the 2012 WCM had significant consequences to Buffalo Bayou that have been well documented in other sections of this Report. Based on review of the history of Addicks and Barker flood control systems (i.e., levees and outlet works), Geosyntec provides the following opinions:

- When water levels in the Addicks Reservoir exceeded approximately elevation 108.0 ft, water was “naturally” released (or flanked) around the north end of Addicks Dam. By USACE assessment... *“This release was observed to be limited to low velocity sheet flows.”*
- The current condition of the dam at the north end of the Addicks Reservoir includes levees of limited height that are protected from overtopping by roller-compacted concrete. The levee in this area appeared to be undamaged by the overtopping during Hurricane Harvey. These protected levees could have sustained significantly higher floodwaters than imposed

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during Hurricane Harvey, as the velocity of flow would likely remain quite low, due to the local topography.

- In response to dam safety concerns identified by USACE, rehabilitation efforts were completed by USACE after publication of the 1962 RRM to improve performance of the outlet works (i.e., mitigate potential for excessive seepage and piping). The previous (i.e., pre-Hurricane Harvey) maximum pool of record (i.e., elevation 102.65 ft (Addicks) and 95.2 ft (Barker)) were reached in 2016 and provided a full-scale demonstration of the effectiveness of rehabilitation activities at the outlet works completed since imposition of the 2012 WCM. Therefore, it was not necessary from a dam safety perspective to open the gates. In fact, post-Hurricane Harvey assessment has shown that primarily due to the natural flanking release at the north end of the Addicks Reservoir, there was little impact on impounded flood water elevation when the gates were opened.
- It is Geosyntec's opinion that had the gates not been opened during Hurricane Harvey, the maximum pool levels would not have changed significantly and there would have been no significant decrease in dam safety due to levee instability and/or seepage and piping.

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SECTION 9

PRELIMINARY OPINIONS REGARDING DEFENSES THAT MAY BE RAISED

9.1 Introduction

Geosyntec has been informed that USACE may choose to advance legal theories or defenses predicated on a hypothetical scenario assuming that the reservoirs were never constructed. Geosyntec expresses no opinion regarding the legal validity of any such theories or defenses. To evaluate such a hypothetical scenario, we investigated reasonable stormwater management and infrastructure improvements that would be expected from the time the dams were built in the 1940s until the time of Hurricane Harvey in 2017. In addition to these infrastructure improvements, it is reasonable to assume that the land development regulations, land use, stream buffers, and other development over the roughly 70 years from the time the dams were built to 2017 would have varied considerably. These variations would have been driven by Federal regulations, local ordinances, and land development pressures.

9.2 Flood Protection Measures

After the devastating floods of 1929 and 1935, the State of Texas created the Harris County Flood Control District (HCFCD) in 1937 for the purpose of “the control, storing, preservation, and distribution of the storm and flood waters, and the waters of the rivers and streams in Harris County and their tributaries, for domestic, municipal, flood control, irrigation, and other useful purposes, the reclamation and drainage of the overflow land of Harris County, the conservation of forests, and to aid in the protection of navigation on the navigable waters by regulating the flood and storm waters that flow into said navigable streams” (*FEMA FIS, Jan 6, 2017*) *The Flood Insurance Study (FIS) for Harris County, TX and Incorporate Areas dated January 6, 2017*.

The FIS states that “since that time (i.e. 1937), there have been many significant projects to reduce flood damage in Harris County. Many of these projects are the results of partnerships between the HCFCD and the U.S. Army Corps of Engineers (USACE), Federal Emergency Management Agency (FEMA), and others.” It is reasonable to assume that if the two dams were not constructed, the HCFCD and their partners would have continued their efforts to evaluate and implement a range of alternative flood mitigation practices and flood protection measures to address land development pressure.

Reasonable alternatives to the dams which would have been required to maintain a level of land development along Buffalo Bayou are expected to include:

- channel modifications such as widening, straightening, and/or lining the bayous to improve downstream conveyance;

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- additional levees around property to protect against extreme flood events within the bayous;
- improved bridge standards in terms of bridge elevation, design flows, and structural support;
- the use of detention and/or retention ponds to decrease peak flow rates and/or runoff volumes;
- residential development changes in downstream properties with respect to density, impervious cover, and proximity to bayous;
- additional diversion channels, local conveyance systems, and bypass channels to allow for multiple flow paths within the built environment;
- stormwater runoff and drainage plans for an integrated approach to the improved management and control of runoff;
- regulatory land development code changes related to building location, minimum elevation of structures or homes above the base flood elevation, and local drainage controls; and
- revised regulatory Flood Insurance Studies prepared by FEMA to map and delineate flood risk zones.

The central and common element influencing the implementation of flood mitigation practices and flood protection measures within the area of interest of this Report is the flooding along Buffalo Bayou. The purpose of each practice or measure is to reduce the risk of damage or loss of life, as was central to the original formation of the HCFCD. This idea was reinforced when Congress created the National Flood Insurance Program (NFIP) in 1968 to reduce flood losses and disaster relief cost by guiding future development away from flood hazard areas where practicable, requiring flood resistant design and construction, and transferring costs of losses to floodplain occupants through flood insurance premiums.

As is noted on the HCFCD website (HCFCD.org), examples of flood mitigation include elevating homes and business above the base flood, relocating homes out of the floodplain, and minimizing the vulnerability to flood damage through both structural and nonstructural means. An important element of the NFIP is the adoption of ordinance and development codes at the local level that protect structures. One such example is the City of Houston's requirement to construct buildings with a finish floor at least two feet higher than the 500-year floodplain. This reinforces that if the two dams were not constructed in the 1940s, alternative flood mitigation practices and flood protection measures would have been evaluated, which would have included the establishment of ordinances and development codes to protect structures.

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9.3 Deposition Testimony

Several of the testimonies given by the range of professions with knowledge of the flood control and flood protection systems in the Houston area, express agreement that alternative measures would likely have been evaluated and implemented if the two dams were not constructed.

We agree with **Jeff Lindner** (chief meteorologist, HCFCD) who stated in the deposition testimony that had no dams been built, “there definitely probably would have been some engineering studies” performed to evaluate the best flood control projects. Mr. Lindner stated that if Addicks and Barker Reservoirs had not been constructed, the area along Buffalo Bayou would be uninhabitable, assuming if no other measures were implemented. From the deposition, Mr. Lindner concurred that reasonable flood risk management alternatives include:

- concrete lining of the bayou;
- widening, deepening, removing obstacles and straightening of the bayous;
- levees;
- diversion channels;
- storm drains and pipes constructed by municipalities;
- local codes for developers to build flood control systems;
- zoning to ensure that future development is constructed at an elevation that would potentially remove structures from various floodplains as an alternative for flood risk management; and
- not developing land in areas that are prone to inundation is an alternative for flood risk management.

We agree with **Jamila Johnson** (flood control manager, City of Houston) who stated in the deposition testimony that if no dams were constructed, the floodplain would be different. She indicated that the City of Houston would still require buildings to be built two feet higher than the 500-year floodplain. When compared to current flood protection elevations, Ms. Johnson indicated that higher flood protection elevations would be required if no dam was constructed, or else there would be no building at all along Buffalo Bayou. We concur that if the dams were not constructed, the floodplain would likely be higher and would require buildings to be raised to a higher elevation to provide the same two feet of freeboard above the 500-year floodplain.

In the deposition testimony, **Braxton Coles** (drainage maintenance, City of Houston) expressed his opinion that the damage was not caused by the City’s storm drain system. Based on his experience, rainwater typically drains in Houston within one day. After Harvey, his crews inspected the system and found the drainage system was in good working order, and thus it is his opinion that the water staying for a week later was not caused by the City’s system.

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9.4 Flood Risk Mapping

Through the National Flood Insurance Program (NFIP), FEMA is the recognized source for flood risk information. Residents can readily research and understand their flood risk with online mapping tools and obtaining readily available information such as the FIS, Water Surface Profiles, and FEMA Flood Insurance Rate Map (FIRM). These collectively provide information to homeowners making informed decisions. The current FIS for Harris County, TX and Incorporate Areas is dated 6 January 2017, prior to Hurricane Harvey.

Section 2.4 “Flood Protection Measures” of the FIS states that the dams help protect the City of Houston from floodwaters. Water is stored only for flood control and is released when flooding is no longer a danger. When significant runoff producing storms occur, the gates are closed and remain closed until the peak at Piney Point passes and the discharge drops below 2,000 cfs. Reservoir releases will not be made any time the 2,000 cfs limit is exceeded (considered a non-damaging discharge) in Buffalo Bayou at Piney Point.

9.5 Opinions

We believe based on reasonable probability and engineering judgement that alternative flood protection measures to the Addicks and Barker Dams would have been considered and built over the past 70 years of development, if the two dams were not constructed. These alternatives, which would have included stormwater management, flood protection and mitigation, and improved conveyance, would have likely provided similar or better protection to the 13 downstream test properties when compared to the performance of the Addicks and Barker Dams during Hurricane Harvey.

- It is reasonable to assume that other alternative flood protection measures would have been implemented in place of the reservoirs if they were not constructed. The alternative measures would have included structural practices and policies or ordinances to limit where development occurred and how structures are constructed.
- Alternative structural measures and practices would have likely included:
 - improvement of channel conveyance by lining the bayous with concrete or armoring;
 - improvement of channel conveyance by making the bayou channel wider, deeper, straighter, or by removing obstructions;
 - construction of levees to limit inundation;
 - construction of diversion channels;
 - expansion of culverts, trunk storm sewers, drains, and local stormwater management systems; and

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- control of stormwater runoff from development by the construction of detention basins as part of private land development to offset potential increases to flood flows.
- Alternative policies and ordinances that would have been implemented are likely to have included:
 - local codes to require developers to construct stormwater management systems, such as detention basins to control runoff from development;
 - local codes to require developers to evaluate flood risk and construct appropriate flood control or management systems to protect their proposed developments;
 - local codes to protect structures from damage, such as raising the building or critical facilities two feet above the 500-year floodplain or requiring the use of flood proof material; and
 - local codes to restrict development in the floodplain and require mitigation measures if the floodplain is impacted by development. An example includes the requirement that proposed fill in the floodplain must be offset by appropriate compensating volume.

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SECTION 10

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Appendix A1

Matt Bardol Background

Including:

- C.V.
- List of Publications Authored in the Previous 10 Years
- List of Cases in Which he Testified in Trial or Deposition for the Previous 4 Years
- Fee Schedule

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Appendix A2

Bob Bachus Background

Including:

- C.V.
- List of Publications Authored in the Previous 10 Years
- List of Cases in Which he Testified in Trial or Deposition for the Previous 4 Years
- Fee Schedule

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Appendix B

HEC-HMS and 1D HEC-RAS Model Analyses

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Appendix C

Enhanced 2D HEC-RAS Model Analysis

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Appendix D

Inflow Time Series Analysis

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Attachment 1

FEMA Flood Insurance Study Flood Profiles and Table 3

(source: FEMA, 2017)

IN THE UNITED STATES COURT OF FEDERAL CLAIMS

IN RE DOWNSTREAM ADDICKS AND
BARKER (TEXAS) FLOOD-CONTROL
RESERVOIRS

§
§
§ Sub-Master Docket No. 17-cv-9002L

THIS DOCUMENT RELATES TO:

§
§ Judge Loren A. Smith

ALL TEST PROPERTIES

§
§
§

AFFIDAVIT OF ROBERT BACHUS, Ph.D., P.E.

1. "My name is Robert Bachus. I am over the age of eighteen, of sound mind, and capable to make this affidavit. The facts stated in this affidavit are true and correct and within my personal knowledge.
2. Attached and incorporated by reference to this Affidavit is a true and correct copy of my report of November 13, 2018, which contains a fair and accurate summary of the opinions I have rendered in this matter, the bases for those opinions, and a fair and accurate summary of my background, education, training, and experience.

FURTHER AFFIANT SAYETH NOT."


ROBERT BACHUS

SWORN TO AND SUBSCRIBED before me this 12 day of June, 2019.




NOTARY PUBLIC, STATE OF

INITIAL EXPERT OPINION REPORT

In Re Downstream Addicks and Barker (Texas) Flood-Control Reservoirs

Prepared for:

Downstream Litigation Leadership Team

On Behalf of:

McGehee, Chang, Landgraf
10370 Richmond Ave, Suite 1300
Houston, TX 77042

Mithoff Law Firm
500 Dallas Street, Suite 3450
Houston, TX 77002

Fleming, Nolen & Jez, LLP
2800 Post Oak Blvd, Suite 4000
Houston, TX 77056

Prepared by:

Matt Bardol, P.E.¹, CFM, D.WRE
Robert Bachus, Ph.D., P.E.², D.GE

Geosyntec 
consultants

engineers | scientists | innovators

1420 Kensington Rd, Suite 103
Oak Brook, IL 60523

¹ Professional Engineer licensed in IL, IN, MO, MI, MS, NE, OH, CA, HI

² Professional Engineer licensed in GA, AR, MS, PA, KY, TN, AL, NC

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LIST OF ACRONYMS

1D	one-dimensional
2D	two-dimensional
ac-ft	acre-feet
asl	above sea level
CCR	coal combustion residual
CFM	Certified Floodplain Manager
cfs	cubic feet per second
DEM	digital elevation model
D.GE	Diplomate, Geotechnical Engineering
D.WRE	Diplomate, Water Resources Engineer
EAP	Emergency Action Plan
elev	elevation
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
ft	feet
GOL	government owned land
HCFCDD	Harris County Flood Control District
HEC	Hydrologic Engineering Center
HMS	Hydrologic Modeling System
hr	hour
in.	inch
NAVD	North American Vertical Datum
NED	National Elevation Dataset
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
P.E.	Professional Engineer
RAS	River Analysis System
RoR	rate of rise
RRM	Reservoir Regulation Manual
TNRIS	Texas Natural Resources Information System
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WCM	Water Control Manual
WSE	water surface elevation

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SECTION 1

INTRODUCTION

1.1 Terms of Reference

I, Matthew Bardol, have been retained by the Downstream Litigation Leadership Team which includes the following three attorneys: (i) McGehee, Chang, Landgraf; (ii) Mithoff Law Firm; and (iii) Fleming, Nolen & Jez, LLP; on behalf of the 13 downstream test property plaintiffs, in connection with In Re Downstream Addicks and Barker (Texas) Flood-Control Reservoirs (case 17-CV-9002L). I have been asked to prepare this Initial Expert Opinion Report ("Report") to address opinions related to engineering analyses of damages to the 13 downstream test properties and in the above-referenced lawsuit that relate to inundation downstream of Addicks and Barker dams in Houston, Texas.

Geosyntec is compensated for my services related to this matter at a rate of \$305 per hour for investigation, analysis, and report preparation, deposition and trial preparation, and at a rate of \$610 per hour for deposition and court appearances. Compensation for all work related to this matter is in no way tied to the outcome of this litigation.



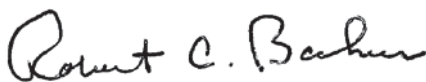
Matt Bardol, P.E., CFM, D.WRE

13 November 2018

Date

I, Robert Bachus, have been retained by the Downstream Litigation Leadership Team which includes the following three attorneys: (i) McGehee, Chang, Landgraf; (ii) Mithoff Law Firm; and (iii) Fleming, Nolen & Jez, LLP; on behalf of the 13 downstream test property plaintiffs, in connection with In Re Downstream Addicks and Barker (Texas) Flood-Control Reservoirs (case 17-CV-9002L). I have been asked to prepare only **SECTION 8** of this Initial Expert Opinion Report ("Report") to address opinions related to the integrity of the Addicks and Barker Reservoirs including but not limited to the spillways.

Geosyntec is compensated for my services related to this matter at a rate of \$305 per hour for investigation, analysis, and report preparation, deposition and trial preparation, and at a rate of \$610 per hour for deposition and court appearances. Compensation for all work related to this matter is in no way tied to the outcome of this litigation.



Bob Bachus, Ph.D., P.E., D.GE

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1.2 Professional Background and Qualifications

Matthew Bardol is a Senior Principal in the Oak Brook office of Geosyntec Consultants (Geosyntec) located at 1420 Kensington Road, Suite 103, Oak Brook, IL 60523, and has been with Geosyntec since June 2010. Geosyntec performs consulting services for civil engineering and water resources projects throughout the United States, as well as internationally in Canada, Asia, Australia, and Europe. As a representative of Geosyntec, Mr. Bardol tenders his preliminary opinion responsive to the Scope of Work stated in **Section 1.3** below.

Mr. Bardol obtained his Bachelor of Science degree in Civil Engineering from University of Notre Dame in 1996. In 1999, he obtained his Masters of Science in Environmental Management from Hardin-Simmons University in Abilene, Texas. In 2002, he obtained his Masters of Science in Civil Engineering, with an emphasis in water resources, from the University of Southern California, in Los Angeles, California.

Mr. Bardol has over 22 years of experience in civil and water resources engineering and hydrologic and hydraulic modeling, including models that predict and quantify flood inundation from storm events. He has been involved with and worked on civil and water resources engineering projects throughout his career, with an emphasis on water resources engineering and modeling projects for the past 17 years.

Mr. Bardol is a Professional Environmental Engineer, and he has been a practicing licensed Professional Engineer (P.E.) in the State of California since 2001 and has received reciprocity in multiple states across the U.S. Further details outlining Mr. Bardol's work experience and qualifications to serve as an expert are described in his background information, which is attached to this Report as **Appendix A**.

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Robert Bachus is a Senior Principal in the Kennesaw office of Geosyntec Consultants (Geosyntec) located at 1255 Roberts Blvd., Suite 200, Kennesaw, GA 30144, and has been with Geosyntec since September 1990. As a representative of Geosyntec, Dr. Bachus tenders his preliminary opinion responsive to the Scope of Work stated in **Section 1.3** below.

Dr. Bachus obtained his Bachelor of Science and Masters of Science degrees in Civil Engineering from University of Illinois Chicago Circle in 1974 and 1975, respectively. In 1982, he obtained his Doctor of Philosophy in Geotechnical Engineering from Stanford University.

Dr. Bachus has over 35 years of experience in geotechnical and geoenvironmental engineering, including geotechnical site characterization, settlement and slope stability analysis, and performance monitoring of geotechnical features and earth structures. He previously served as a geotechnical engineering faculty at Georgia Institute of Technology and focused his research on the beneficial re-use of coal combustion residuals (CCRs) and engineering applications for geosynthetic materials, primarily on reinforcing and drainage produce development.

Dr. Bachus is a Professional Engineer, and he has been a practicing licensed Professional Engineer (P.E.) in the State of Georgia since 2003 and has received reciprocity in multiple states across the U.S. Further details outlining Dr. Bachus's work experience and qualifications to serve as an expert are described in his background information, which is attached to this Report as **Appendix A**.

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1.3 Scope of Work

Geosyntec has been asked to review documents and data cited in **Section 1.4** below to assess whether and to what extent the induced surcharge procedures initiated by the U.S. Army Corps of Engineers (USACE) caused inundation of and associated damage to 13 downstream test properties and whether such inundation and associated damage would have been avoided or reduced without the induced surcharge. We have also been asked to offer preliminary analysis of certain defense arguments that may be raised in this litigation. To that extent, we reserve the right to amend our report and/or add opinions and conclusions based on future evidence.

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1.4 Scope and Bases of Opinions

Geosyntec was asked to conduct an evaluation of the hydrologic and hydraulic impacts of Hurricane Harvey in conjunction with the operation of the Addicks and Barker Reservoirs on behalf of the Downstream Litigation Leadership Team. We reviewed the following data and documents in preparation for this Report, and these data and documents serve as the bases of our opinions. We reviewed a two-dimensional (2D) model developed by the USACE using the USACE Hydrologic Engineering Center (HEC) River Analysis System (RAS) software version 5.0.5 (HEC-RAS). We also reviewed the one-dimensional (1D) HEC-RAS model developed by the Harris County Flood Control District (HCFCD) which is the basis of the regulatory Federal Emergency Management Agency (FEMA) effective floodplain models for Harris County. Furthermore, we reviewed Dr. Phil Bedient's (Herman Brown Professor of Engineering at Rice University) modifications to the HCFCD 1D HEC-RAS model. We reviewed hydrology models including the HCFCD regulatory model based on the USACE Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS), as well as Dr. Bedient's HEC-HMS model simulating flows during Hurricane Harvey. We also reviewed additional data and testimony as indicated below.

- USACE 2D HEC-RAS model (provided as modeling files during discovery labeled with Bates number USACE189773)
- HCFCD 1-D HEC-RAS model (HCFCD, 2018a)
- Dr. Bedient's 1D HEC-RAS model (Bedient, 2018)
- HCFCD HEC-HMS model (HCFCD, 2018a)
- 1962 Reservoir Regulation Manual (RRM) for Addicks and Barker Reservoirs Initial and Emergency Instructions to Dam Tender (USACE, 1962)
- 2012 Water Control Manual (WCM) for Addicks and Barker Reservoirs, Buffalo Bayou and Tributaries, San Jacinto River Basin, TX (USACE, 2012)
- 2014 Emergency Action Plan (EAP) for Addicks and Barker Reservoirs, Buffalo Bayou and Tributaries (USACE, 2014)
- USACE "Hurricane Harvey Flood Inundation Mapping After Action Report" (USACE, 2018)
- USACE spreadsheet of pool level, gate outflow rates, rate of rise (RoR), and calculated inflow rates typically referred to as the "morning report" according to Kauffman deposition (provided as spreadsheet during discovery labeled with Bates number USACE006034)
- U.S. Geological Survey (USGS) stream flow and water surface elevation (WSE) gauge data (USGS, 2018) at the following locations:
 - 08072500 Barker Res nr Addicks, TX
 - 08072600 Buffalo Bayou at State Hwy 6 nr Addicks, TX
 - 08073000 Addicks Res nr Addicks, TX

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- 08073100 Langham Ck at Addicks Res Outflow nr Addicks, TX
- 08073500 Buffalo Bayou nr Addicks, TX
- 08073600 Buffalo Bayou at W Belt Dr, Houston, TX
- 08073700 Buffalo Bayou at Piney Point, TX
- 08074000 Buffalo Bayou at Houston, TX
- Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for Harris County, Texas (FEMA, 2017)
- Downstream plaintiff testimony including the following plaintiffs:
 - Arnold Milton testimony on 10 July 2018 (Milton, 2018a)
 - Virginia Milton testimony on 10 July 2018 (Milton, 2018b)
 - Jennifer Shipos testimony on 19 September 2018 (Shipos, 2018)
 - John Britton, for SMC Memorial Investment 2013 LP, testimony on 16 July 2018 (Britton, 2018)
 - Jeremy Good, for Good Resources LLC, testimony on 19 July 2018 (Good, 2018)
 - Val Aldred testimony on 1 August 2018 (Aldred, 2018)
 - Peggy Hollis testimony on 19 July 2018 (Hollis, 2018a)
 - Wayne Hollis testimony on 19 July 2018 (Hollis, 2018b)
 - Peter Silverman testimony on 18 July 2018 (Silverman, 2018a)
 - Zhennia Silverman testimony on 18 July 2018 (Silverman, 2018b)
 - Arnstein Godejord testimony on 17 September 2018 (Godejord, 2018a)
 - Igna Godejord testimony on 17 September 2018 (Godejord, 2018b)
 - Dana Cutts testimony on 27 June 2018 (Cutts, 2018a)
 - Paul Cutts testimony on 27 June 2018 (Cutts, 2018b)
 - Gokhan Beyoglu testimony on 18 September 2018 (Beyoglu, 2018b)
 - Jana Beyoglu testimony on 18 September 2018 (Beyoglu, 2018a)
 - Phillip Azar testimony on 9 July 2018 (Azar, 2018)
 - Tim Stahl testimony on 5 September 2018 (Stahl, 2018)
 - Shawn Welling testimony on 14 August 2018 (Welling, 2018)
 - Dutch Lindeburg testimony on 26 September 2018 (Lindeburg, 2018)
- USACE witness testimony including the following witnesses:
 - Michael Kauffman expert testimony on 25 September 2018 (Kauffman, 2018)
 - Robert Thomas expert testimony on 31 July 2018, 3 August 2018, and 7 September 2018 (Thomas, 2018)
 - Jeff Lindner expert testimony on 24 September 2018 (Lindner, 2018)
 - Jamila Johnson expert testimony on 19 October 2018 (Johnson, 2018)

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- Braxton Coles expert testimony on 19 October 2018 (Coles, 2018)
- Texas Natural Resources Information System (TNRIS) elevation data (TNRIS, 2018)
- HCFCFCD precipitation data sources (HCFCFCD, 2018b)
- High water marks (provided as spreadsheet during discovery labeled with Bates number FEMA004231, summary tables labeled with Bates numbers USACE150516 and USGS0000032, and shapefile labeled with Bates number FEMA004230)

The list of documents considered and the modeling files referenced above can be found in **SECTION 10** at the end of this Report.

Given the limited time period for submission of this Report under the Court's schedule, we have not undertaken an effort to address all of the points and issues associated with this case, and we may revise or supplement the information in this Report as we continue to review the testimony of technical experts and eyewitnesses, the digital model files provided, and the Expert Reports submitted to the court.

We also reserve the right to examine additional information as it becomes available, including through further discovery in this case, and to add to or modify our opinions based on such additional information.

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1.5 Report Organization

This Report is organized as follows:

- **SECTION 1** describes the terms, background, mission, and scope of this Report;
- **SECTION 2** presents an introduction and factual background to the case;
- **SECTION 3** presents the 13 downstream test properties considered in this Report;
- **SECTION 4** presents a review of the data sources relied upon and a general timeline of events during Hurricane Harvey;
- **SECTION 5** provides an overview of the hydraulic modeling methodology used in developing opinions related to inundation of the 13 downstream test properties;
- **SECTION 6** provides an overview of the hydraulic modeling results discussed in the methodology section related to inundation of the 13 downstream test properties;
- **SECTION 7** presents opinions related to inundation of the 13 downstream test properties as a result of the engineering analyses conducted;
- **SECTION 8** presents opinions related to the integrity of the Addicks and Barker Reservoirs including but not limited to the spillways;
- **SECTION 9** provides preliminary opinions on the defense arguments that have been raised or potentially may be raised later; and
- **SECTION 10** presents a detailed list of references.

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SECTION 2

INTRODUCTION AND FACTUAL BACKGROUND

2.1 History and Purpose of the Reservoirs

Addicks Dam, as presently constructed, includes an earthen dam approximately 61,000 feet (ft) long, with the top of the dam at elevation 121.0 ft³ (USACE, 2012 at Sec. 2-03a). The ends of the embankment terminate at a natural ground elevation of 108.0 ft on the north end and 112.0 ft on the west end (USACE, 2012 at Sec. 2-03a). Two auxiliary spillways, located at the north and west ends of the dam embankment, were reinforced with roller-compacted concrete by September 1988 (USACE, 2012 at Sec. 2-03a; Table 3-01).

Barker Dam, as presently constructed, includes an earthen dam approximately 72,000 ft long, with the top of the dam at an elevation of 113.1 ft (USACE, 2012 at Sec. 2-03c). The ends of the embankment terminate at a natural ground elevation of 104.0 ft (USACE, 2012 at Sec. 2-03c). Two auxiliary spillways, located at the northwest and southwest ends of the dam embankment, were reinforced with roller-compacted concrete by September 1988 (USACE, 2012 at Sec. 2-03c; Table 3-01).

The USACE describes the purpose of the Addicks and Barker Reservoirs as including “flood risk management protection provided to the City of Houston from flood damages... The two reservoirs provide floodwater detention for flood risk management on the Buffalo Bayou watershed...” (USACE, 2012 at Sec. 2-02). As initially designed, the outlets of each reservoir consisted of five box culvert conduits, with one conduit gated and the other four uncontrolled (USACE, 2012 at Sec. 3-02). By February 1963, all of the conduits on both reservoir outlets had been gated (USACE, 2012 at Table 3-01). According to the USACE, “the gating of the last two uncontrolled conduits on both projects in 1963 made it possible to reduce downstream flooding...” (USACE, 2012 at Sec 3-05).

2.2 USACE Considerations in Operating the Reservoirs

An October 2009 “Draft Operational Assessment of the Addicks and Barker Reservoirs” (USACE, 2009; USACE464017), confirms that “[t]he sole authorized purpose for Addicks and Barker Reservoirs is to reduce potential flood damage along the downstream reach of Buffalo Bayou” (USACE, 2009 at USACE464026). The 2009 “Draft Operational Assessment” further evaluates “operational constraints” for the reservoirs, as they relate to both downstream and upstream flooding risk (USACE, 2009 at USACE464039, emphasis added):

³ Unless otherwise specified, all elevations herein are specified in feet, NAVD 1988 (North American Vertical Datum 1988, Epoch 2001).

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The increase in downstream development (and possibly downstream tributary inflow) has contributed to reductions in allowable outflows. ***The dams are operated strictly to prevent downstream flooding; therefore, the gates remain shut even if pool levels increase and flood upstream properties.*** The flood pools have never exceeded the limit of GOL [government owned land] and the homes upstream of the dams have not flooded due to the pool. However, available hydrologic models indicate that the limit of GOL would be exceeded in extreme events; for example, it is believed that if Tropical Storms Allison or Claudette had been centered on the basin, flooding of the upstream development would have occurred.

That same document generally describes the USACE's operational procedures for the reservoirs, and considerations taken into account by the USACE with respect to those procedures (USACE, 2009 at USACE46049, emphasis added):

The current procedure is to prevent downstream flooding and protect downstream properties. During a flooding event, the gates are closed and the reservoir levels are allowed to rise until they overflow the spillways. Since there is development adjacent to the GOL, these structures would be flooded during an extreme event. As noted earlier, there is significant development within the fringe area between the GOL and the maximum pool elevation. ***With such high valuation of upstream properties, it might be desirable to increase the allowable release rates from the reservoir once the downstream peak flows have occurred, and accept some increased duration of downstream flooding.***

2.3 The Purpose of Induced Surcharge Operations

Robert Thomas, the USACE's designated witness to testify regarding "[p]olicies for releases of water from the reservoirs from 2012 through the present..." testified regarding the USACE's release of water (also referred to as "induced surcharge") from the reservoirs during and after Hurricane Harvey. He testified that during Hurricane Harvey, the USACE "started surcharge regulations according to the schedules" in the USACE's 2012 WCM for the reservoirs (Thomas Depo. Vol. I at 140). Operating the reservoirs pursuant to the "induced surcharge flood control regulation" in the 2012 WCM has the effect of opening the reservoir flood control gates and inundating downstream properties (USACE, 2012 at USACE016339). These operation procedures differ from the 2012 WCM's "Normal Flood Control Regulation," which keeps the gates closed during flood events, until releases can be made in a manner that does not cause damaging downstream flooding (USACE, 2012 at USACE016338).

The USACE's 2012 WCM specifies pool level trigger points (coupled with rate of rise thresholds) for commencing induced surcharge operations. For Addicks Reservoir, the pool level trigger point for commencing induced surcharge releases from the reservoir is 101.0 ft. For Addicks Reservoir, the limits of GOL are reached at a pool level of 103.0 ft (Ex. 68 to Thomas Depo. at Table A1).

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Water Elevation Impact Tables published by the USACE in the 2014 Emergency Action Plan (“2014 EAP”) reflect the “first street flooded upstream” for Addicks Reservoir occurs at an elevation of 101.2 ft, and the “first home inundated upstream” for Addicks occurs at an elevation of 103.4 ft (USACE, 2014 at E-2). For Barker Reservoir, the pool level trigger point for commencing induced surcharge releases from the reservoir is 95.7 ft. For Barker, the limits of GOL are reached at a pool level of 95.0 ft (Ex. 68 to Thomas Depo. at Table A2). The 2014 EAP reflects that, for Barker Reservoir, “first street flooded upstream” occurs at an elevation of 94.9 ft, and “first home inundated upstream” occurs at an elevation of 97.1 ft (USACE, 2014 at E-4).

Robert Thomas testified regarding the purpose of making induced surcharge releases (Thomas Depo. Vol. I at 136-138):

- Q. And what are induced surcharge releases?
- A. Generally, that refers to releases within the induced surcharge regulation schedule.
- Q. What is the purpose of making induced surcharge releases?
- A. The purpose of making induced surcharge releases is to, as it says above, utilize the maximum extent possible for the reservoirs.
- * * *
- Q. [I]t’s maximize storage and then prevent water from going around the ends of the dams. Is that what you said?
- A. Right. And in general, to prevent a damaging condition to the dams.

The USACE’s action in commencing induced surcharge operations burdened the downstream test property owners with flooding, by discharging water downstream that, under normal flood control regulation procedures would have protected the downstream test properties by being retained upstream, diverted over the auxiliary spillways to other areas, or released downstream at a later date in a non-damaging manner.

2.4 The Cause of Inundation During Harvey – USACE’s Release of Waters from the Addicks and Barker Reservoirs Pursuant to its Water Control Manual

When the USACE opened the flood control gates for the Addicks and Barker Reservoirs, it did so pursuant to its 2012 WCM for the reservoirs, and released substantial additional water into Buffalo Bayou. The hydraulic modeling, testimony, and other evidence analyzed throughout this Report show that, had the Addicks and Barker gates remained closed, the downstream test properties would not have been inundated (other than the small number of test properties that experienced minimal flooding prior to the gates opening). The opening of the gates by the USACE was thus the cause of inundation and/or worsened and prolonged inundation experienced by the downstream test property owners.

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2.5 USACE Knew in Advance of Opening of the Flood Control Gates the Full Extent of the Damaging Inundation of Downstream Test Properties that Would Occur

Considering the amount of water released according to the induced surcharge schedules in the 2012 WCM, the USACE knew in advance of opening the flood control gates the scope and extent of anticipated downstream inundation. A 2016 “Memorandum for Record,” prepared after the Tax Day Flood and before Hurricane Harvey, indicates that the USACE was aware of what land areas flood first downstream, and at what flow release rates (Ex. 68 to Thomas Depo. at USACE02034):

Determinations of potential flood damages were assessed using USACE surveys of 1st floor structure elevations and Buffalo Bayou reconnaissance of requested releases after the Memorial Day Flood of 2015 and the Tax Day Flood of 2016. Using USACE surveys of 1st floor elevation data, it was determined that the lower level of homes in the vicinity of the West Beltway Bridge (approximately 6.5 miles downstream of the reservoirs) experience flooding at discharges in Buffalo Bayou of 4,100 cfs. This data is consistent with complaints of property inundation typically received by the District at discharges of 3,000 cfs and above. At flows greater than 4,100 cfs, a large percentage of the structures incurring flood damage are located between the bridges over Buffalo Bayou at North Wilcrest Drive (approximately 5 miles downstream of the reservoirs, measured along the streambed) and Chimney Rock Road (approximately 16 miles downstream of the reservoirs).

Both the 2012 WCM and 2014 EAP also contain constant flow area maps, which model downstream Buffalo Bayou inundation at various flow rate assumptions, up to 20,000 cfs (well in excess of the maximum combined release rates from Addicks and Barker Reservoirs during Hurricane Harvey). **Figure 2-1** shown below provides an example of the “Buffalo Bayou Constant Flow Area Map” inundation modeling information available to the USACE prior to Hurricane Harvey.

Mr. Thomas testified that, at the time of Hurricane Harvey, the USACE had the capability to evaluate and to know in advance of opening the flood control gates the full extent of downstream inundation that would occur by street, intersection, and block, within the accuracy of the model itself (Thomas Depo. Vol. III at 547, 556):

- Q. Was the Corps able to ascertain from this modeling what the water surface elevation was at each of those CFS levels?
- A. So the RAS model does estimate elevation and discharge, sir.
- Q. And that was knowledge that the Corps had at the time this was created, this manual and this model was created?
- A. Yes, sir.

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Q. And knowledge that the Corps had at the time of Harvey?

A. Yes, sir.

* * *

Q. Well, you can tell me that the Corps has the capability of zooming in on a model such as 5A?

A. Yes, sir.

Q. You have that technical capability?

A. Yes, sir.

Q. And had it at the time of Harvey?

A. Yes, sir.

Q. So the Corps had the capability to zoom in on a constant flow map or an inundation map, did it not?

A. Yes, sir.

Q. And had that capability at the time of Harvey?

A. Yes, sir.

Q. And the Corps could by zooming in on either this constant flow map or the inundation maps being run pre-Harvey or during the time of Harvey actually identify streets and intersections and blocks on the inundation map?

A. Right. Within the accuracy of the model, sir.

After Hurricane Harvey, the USACE undertook an effort to calculate the percentage of flow in downstream Buffalo Bayou attributable to the reservoir releases (Ex. 73 to Thomas Depo). At times, after the induced surcharge releases began, USACE calculated that up to 100% of flow in Buffalo Bayou was attributable to reservoir releases (Ex. 73 to Thomas Depo).

In addition to the constant flow area maps presented in the 2012 WCM and 2014 EAP, the USACE would have readily had access to the recently prepared Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) dated 6 January 2017 (FEMA, 2017). Detailed Flood Profiles are presented in Volume 8 of the FIS, which include the full length of Buffalo Bayou. These exhibits (included as **Attachment 1** to this Report) present the water surface elevations along the full length of Buffalo Bayou for a range of flows. Table 3 in Volume 1 of the FIS presents peak discharges associated with the 10-, 50-, 100-, and 500-year storm events at six locations along Buffalo Bayou (also included in **Attachment 1** to this Report). Each of these flows are directly associated with the various water surface elevations presented on the exhibits included as **Attachment 1**.

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2.6 There Was No Emergency – The Reservoirs Performed as Expected by USACE

A 27 October 2017 USACE “Memorandum for Commander” states that the reservoirs performed as expected during Hurricane Harvey (Ex. 25 to Thomas Depo. at USACE016689, emphasis added):

The embankment, outlet structures, and emergency spillways functioned as intended. Piezometers, settlement pins, and alignment surveys for the outlet structures do not shown [sic] any alarming trends from this pool of record. There were no observations of seepage, or critical distress areas located on the dams. Wet areas located on the downstream embankment toe were monitored, but showed no signs of flow... *Overall conclusion is that the project was performing as expected with no significant problems during this pool of record event.*

Mr. Thomas testified regarding the purpose of the Memorandum (Thomas Depo. Vol. II at 265):

- Q. What is the purpose of this Memorandum for Commander that has been marked as Exhibit 25? Why was it prepared?
- A. After every flood of record, we prepare a document documenting the state of the dams immediately afterward.
- Q. Is one of the purposes of preparing this memorandum to assess whether or not the Addicks and Barker dams and reservoirs performed as expected during that new pool of record?
- A. Yes, sir.

A “Report of Performance” enclosed with the Memorandum reflects that “the Addicks and Barker dams’ watersheds received between 32-35 inches of rain during a 4-day period, August 25, 2017 through August 29, 2017...” (Ex. 25 to Thomas Depo. at USACE016691). Accordingly, the Memorandum’s finding concerning dam performance during Hurricane Harvey is consistent with the design criteria for the reservoirs, as the “spillway design flood” for the reservoirs is “computed as 44.6 inches in 72 hours, with a peak intensity of 11.3 inches” (USACE, 2012 at Sec. 8-02a).

The Memorandum’s findings are also consistent with the fact that no formal declaration of Level 1, Level 2, or Level 3 “Emergency” was made during Hurricane Harvey, as defined in the 2014 EAP for the reservoirs (USACE, 2014 at 15-16). A Level 1 emergency (the lowest level in the EAP) is defined as “a developing condition in which the dam has not failed but possibly could if the situation continues to develop” (USACE, 2014 at 15). In fact, Mr. Thomas testified that he was not aware of any Level 1, 2, or 3 emergency ever having been formally declared in the history of the dams (Thomas Depo. Vol. II at 275):

- Q Has there ever been a formal declaration of a Level 2 emergency in the history of the Addicks and Barker dams and reservoirs?

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A. Not that I know of, sir.

Q. Has there ever been a formal declaration of Level 1 emergency?

A. Not that I know of, sir.

Q. Has there ever been a formal declaration of Level 3 emergency?

A. Not that I know of, sir.

Per USACE's own post-Harvey report, there is no credible evidence that any emergency implicating possible dam failure existed at the time of Hurricane Harvey.

2.7 Summary of Conclusions

During and after Hurricane Harvey, Addicks and Barker Reservoirs were operated in a manner that caused downstream flooding as a result of induced surcharge operations. Induced surcharge operations had the effect of mitigating upstream inundation, to the detriment of downstream properties, which experienced inundation that otherwise would not have occurred. At the time of Hurricane Harvey, USACE knew – with specificity to streets, blocks, or intersections – the downstream impact of its decision to release water from Addicks and Barker Reservoirs pursuant to the 2012 WCM's induced surcharge procedures. As explained in this Report, action undertaken by USACE to open the Addicks and Barker gates was the decision that caused the downstream test properties to be inundated, and those properties would not have been inundated, and/or would not have been inundated to the extent experienced during and after Hurricane Harvey, but for the induced surcharge release⁴. This decision to abandon from the long-standing policy of protecting downstream properties increased the duration and depth of inundation.

⁴ No conclusions can be reached to a reasonable degree of scientific and engineering probability with respect to downstream test property #12 Stahl

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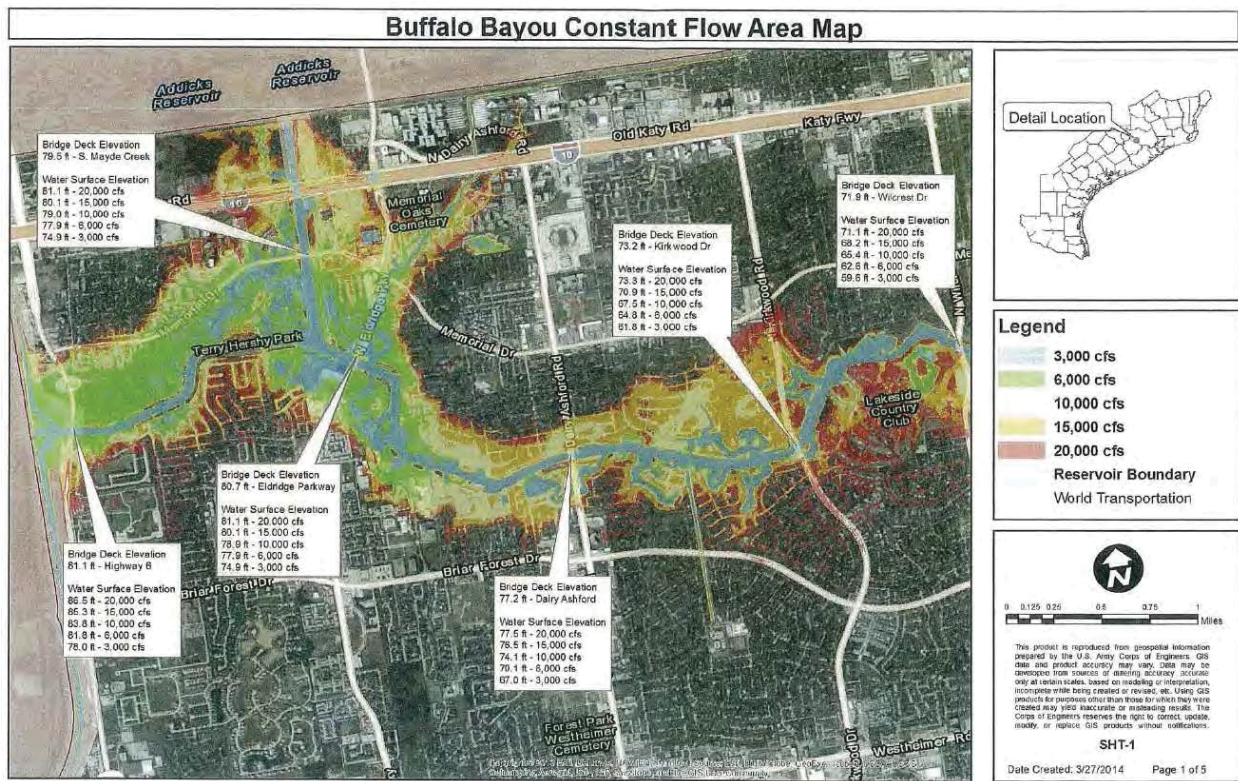


Figure 2-1: Exhibit 5A to Thomas Depo (USACE, 2014)

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SECTION 3

TEST PROPERTIES

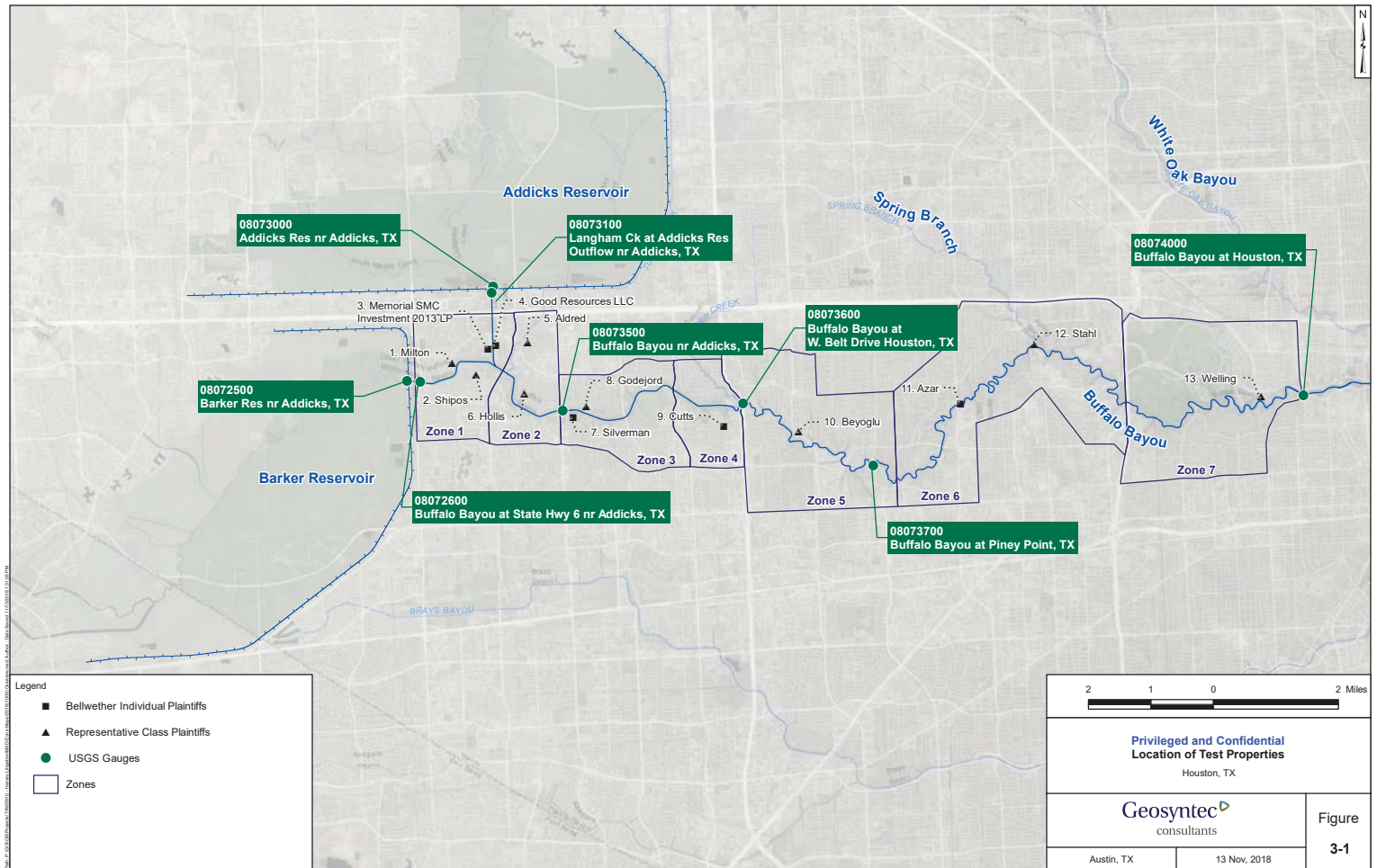
The list of plaintiffs considered in this Report are based on the “Order Regarding Test Property Selection” Document 81, filed 28 March 2018. The only amendment to the list of plaintiffs identified in Document 81 is the removal of the Becky Ho property at 419 West Sam Houston Parkway North. The remaining 13 downstream test properties which were investigated for this Report are summarized in **Table 3-1** below. The “Zone” identification is based on the “Consolidated and Amended Downstream Master Complaint” Document 23, filed 16 January 2018. The only amendments to the zones identified is that the Good Resources LLC property and the Phillip Azar property were not originally identified in the “Consolidated and Amended Downstream Master Complaint.” These 13 downstream test properties, together with the zone designations are shown in **Figure 3-1** (together with associated sub-figures).

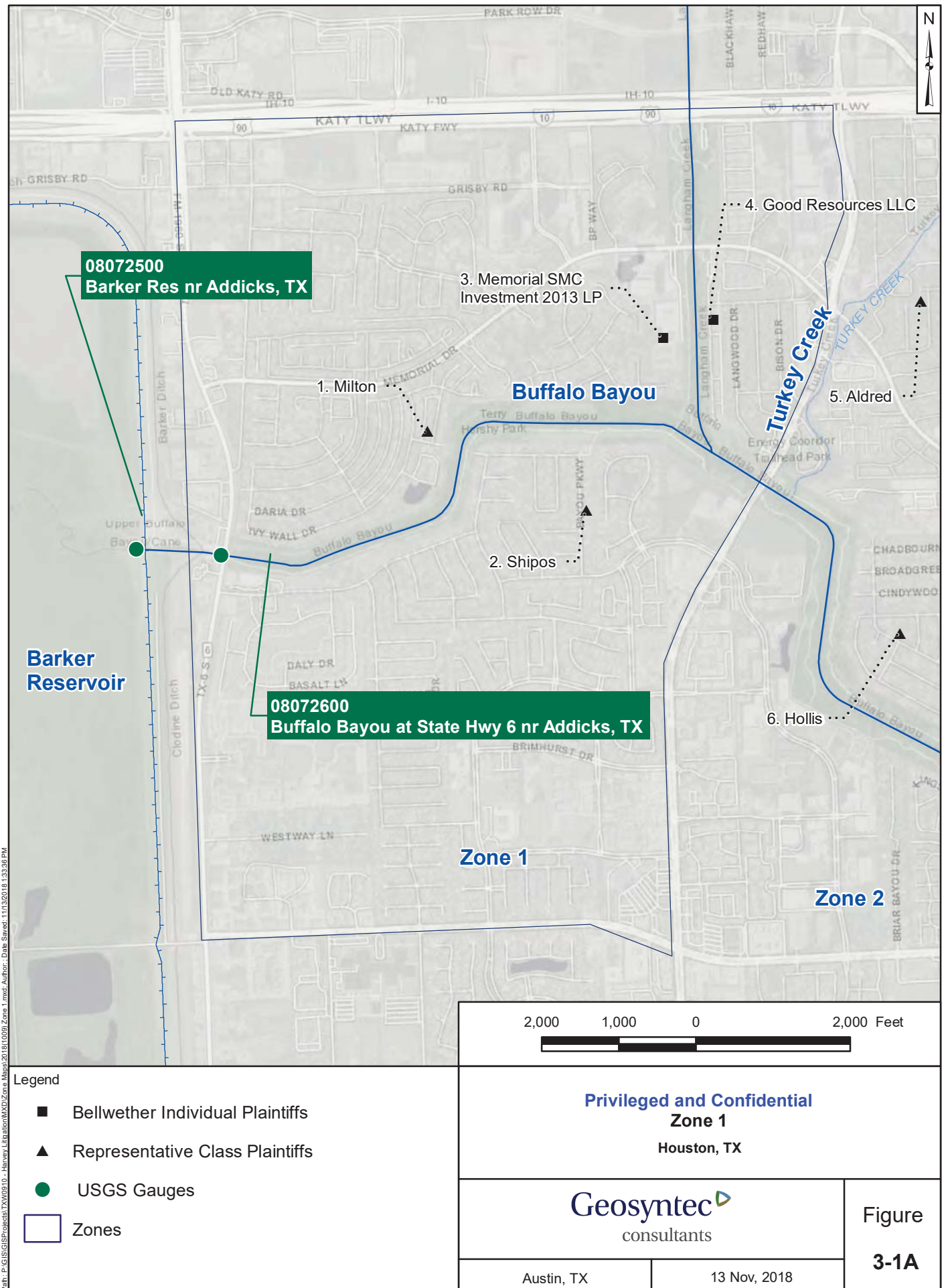
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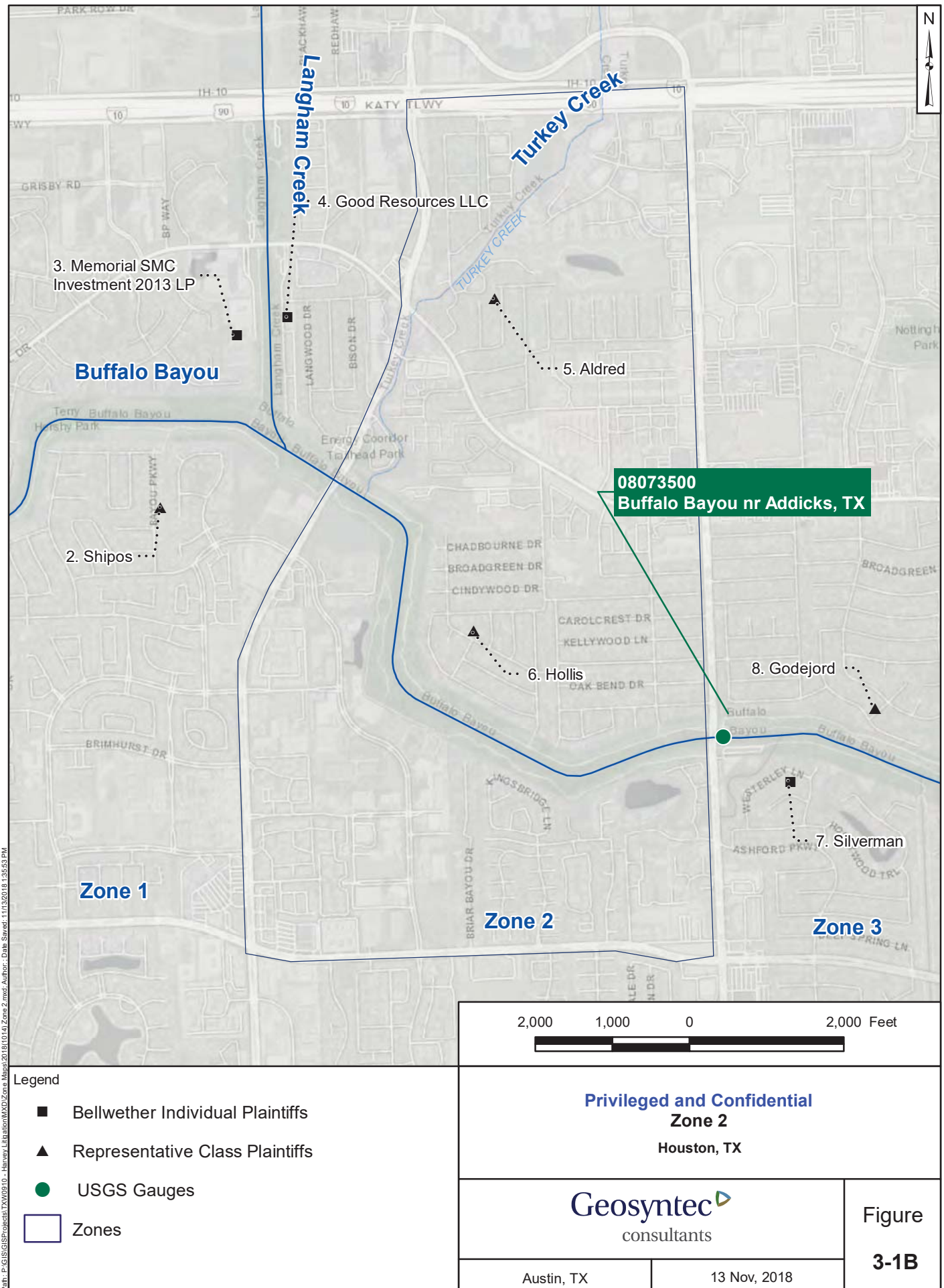
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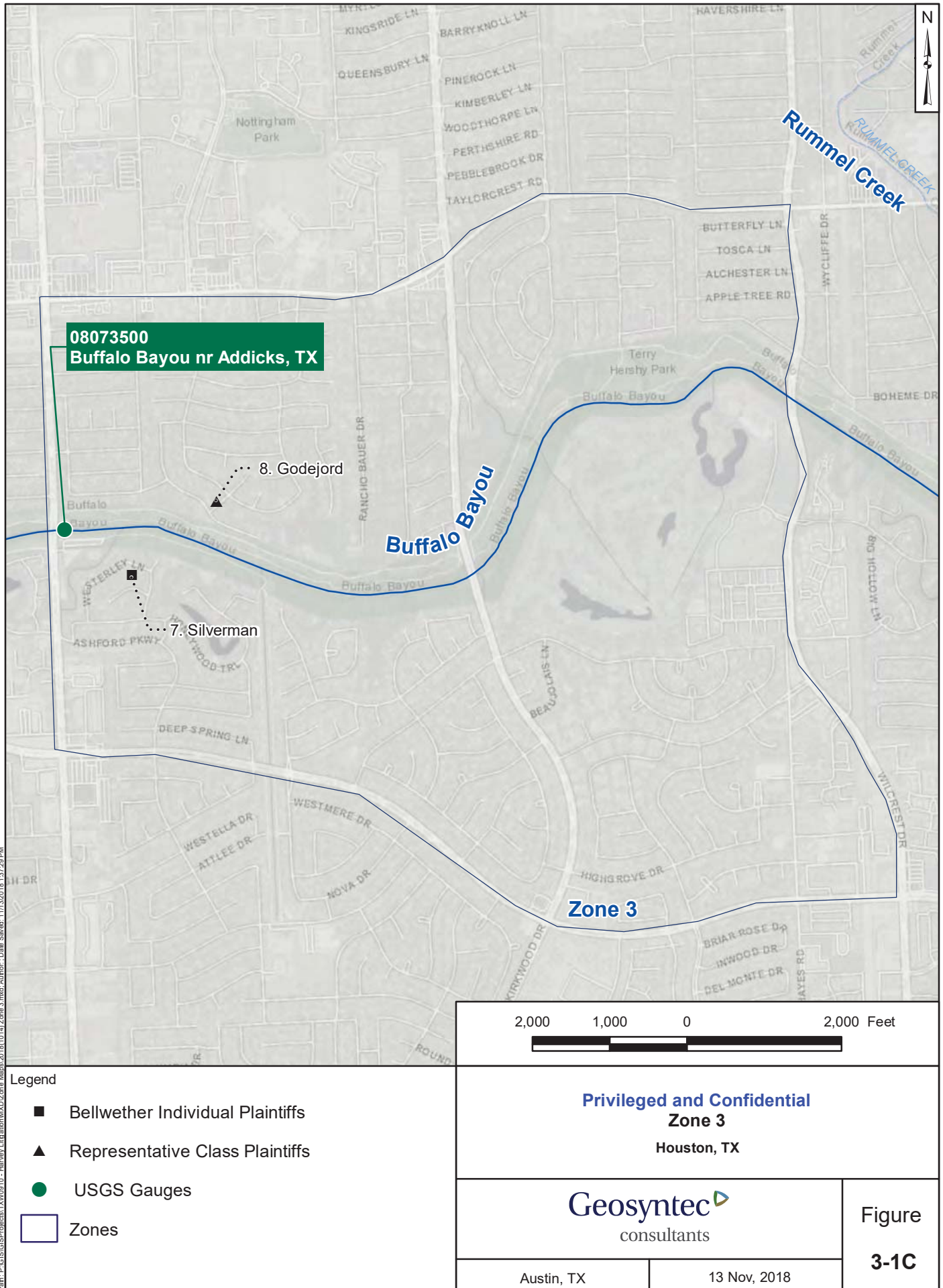
Table 3-1: List of Test Properties

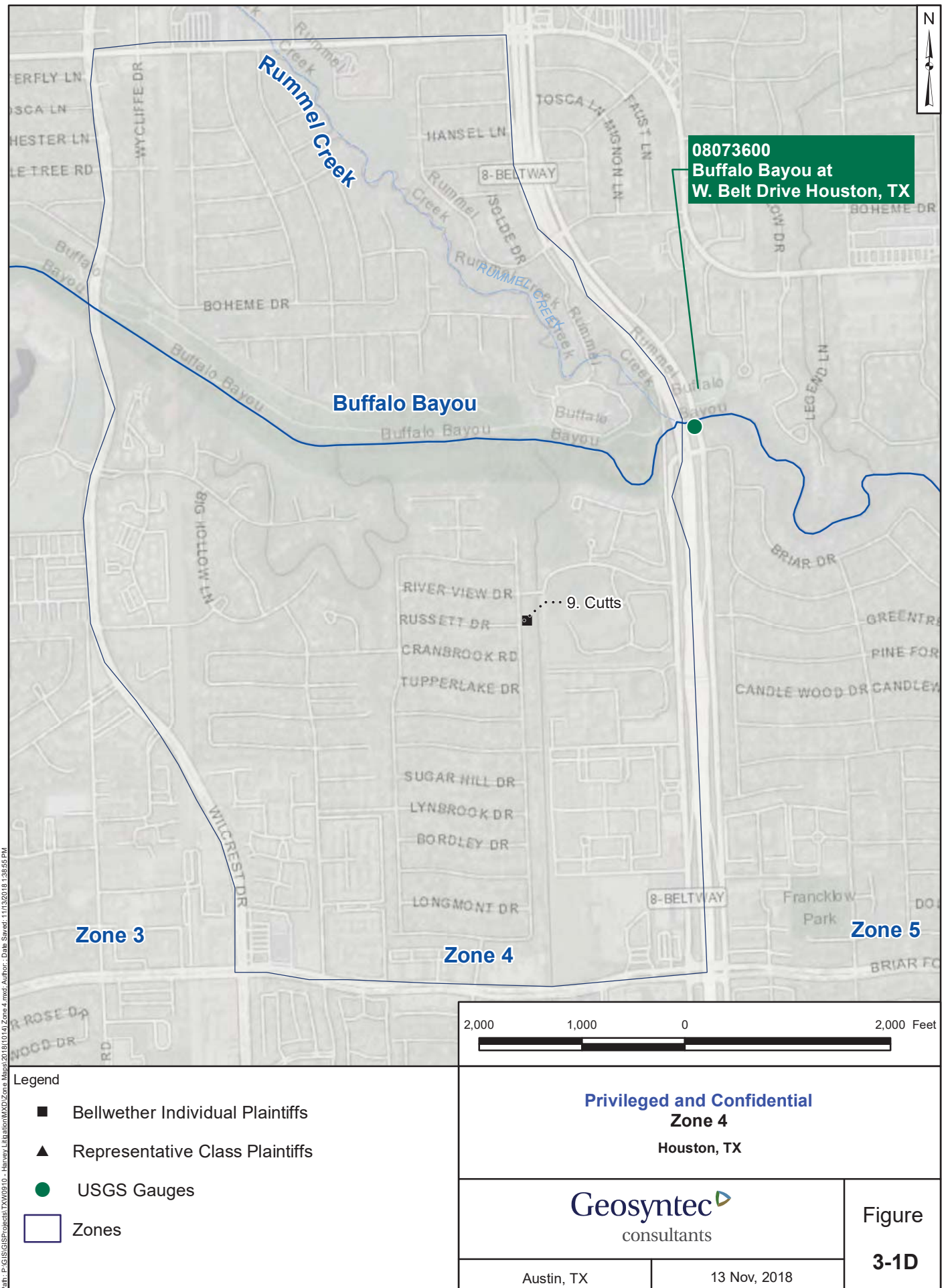
Number	Plaintiff Name	Plaintiff Type	Address	Zone
1	Milton, Virginia and Arnold	Representative Class Plaintiff	850 Silvergate Drive	1-North
2	Shipos, Jennifer	Representative Class Plaintiff	931 Bayou Pkwy	1-South
3	Memorial SMC Investment 2013 LP	Bellwether Individual Plaintiff	777 S Mayde Creek Drive	1-North
4	Good Resources LLC	Bellwether Individual Plaintiff	760 Memorial Mews St. #4	1-North
5	Aldred, Val	Representative Class Plaintiff	835 Thornvine Lane	2-North
6	Hollis, Wayne and Peggy	Representative Class Plaintiff	14914 River Forest Drive	2-North
7	Silverman, Peter and Zhennia	Bellwether Individual Plaintiff	12515 Westerley Lane	3-South
8	Godejard, Arnstein and Igna	Representative Class Plaintiff	14334 Heatherfield Drive	3-North
9	Cutts, Paul and Dana	Bellwether Individual Plaintiff	311 Blue Willow Drive	4-South
10	Beyoglu, Jana and Gokhan	Representative Class Plaintiff	107 Warrenton Drive	5-North
11	Azar, Phillip	Bellwether Individual Plaintiff	3 Magnolia Bend Drive	6-North
12	Stahl, Tim	Representative Class Plaintiff	265 Chimney Rock Road	6-North
13	Welling, Shawn	Representative Class Plaintiff	5731 Logan Lane	7-North

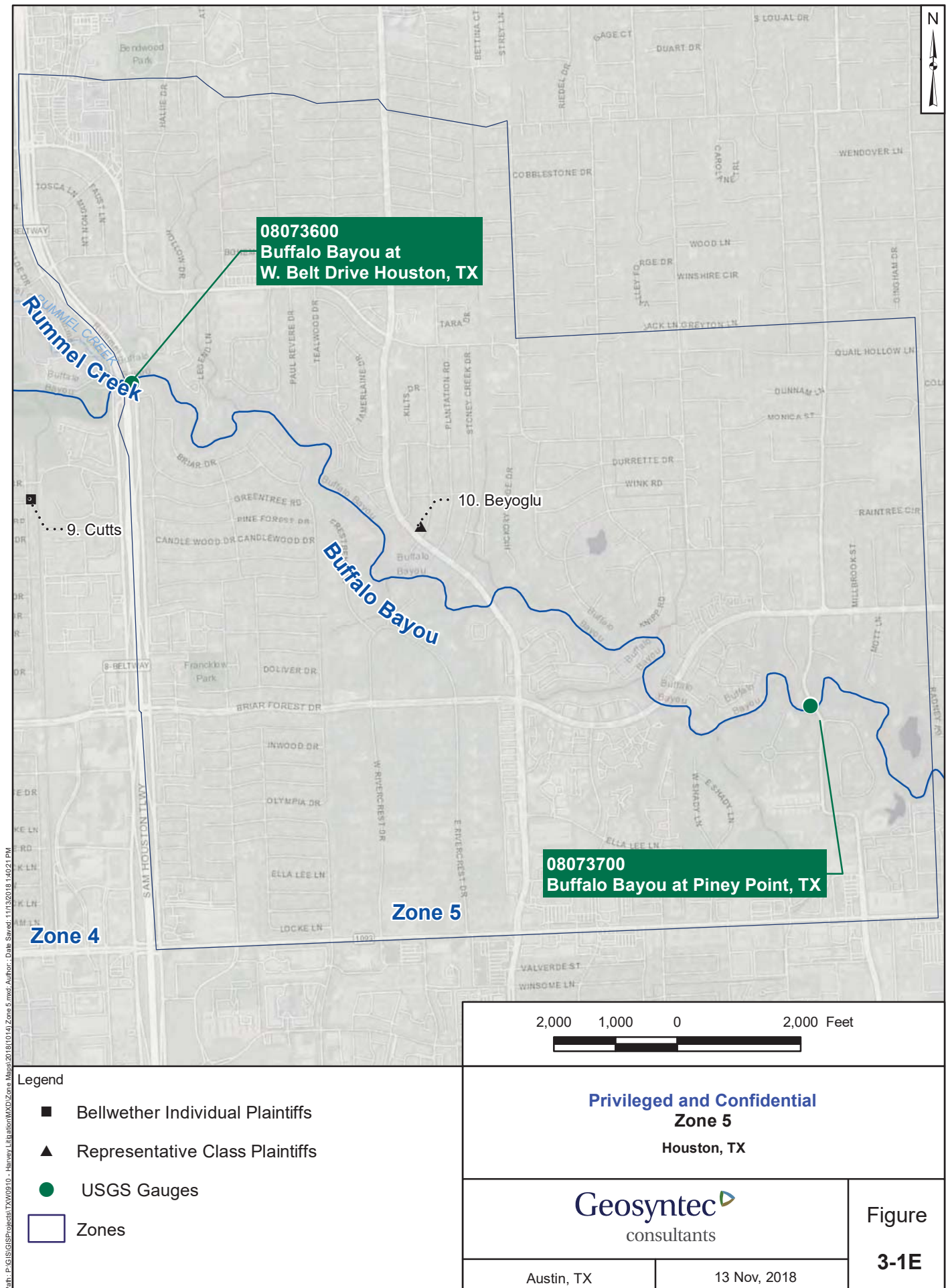


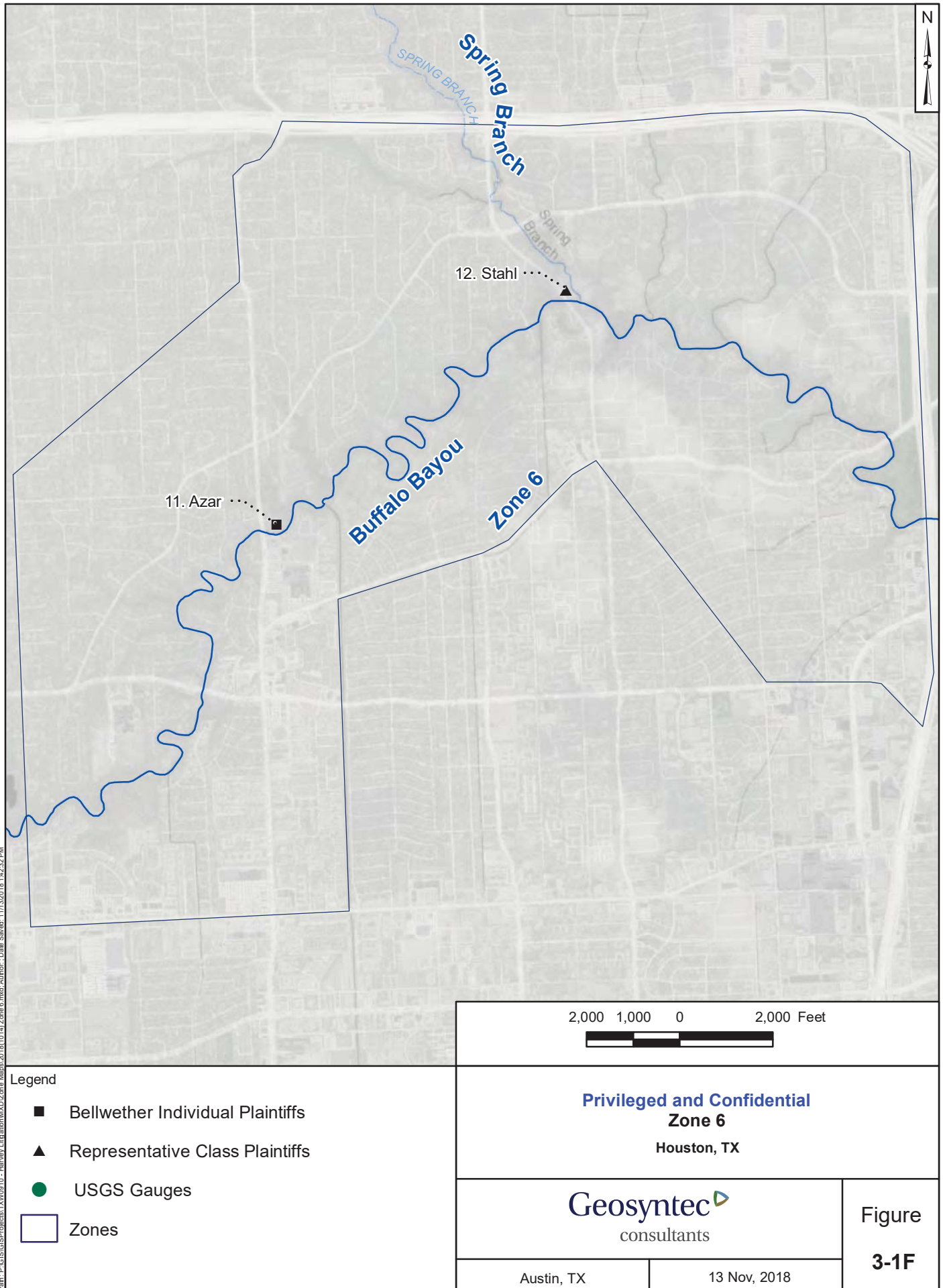


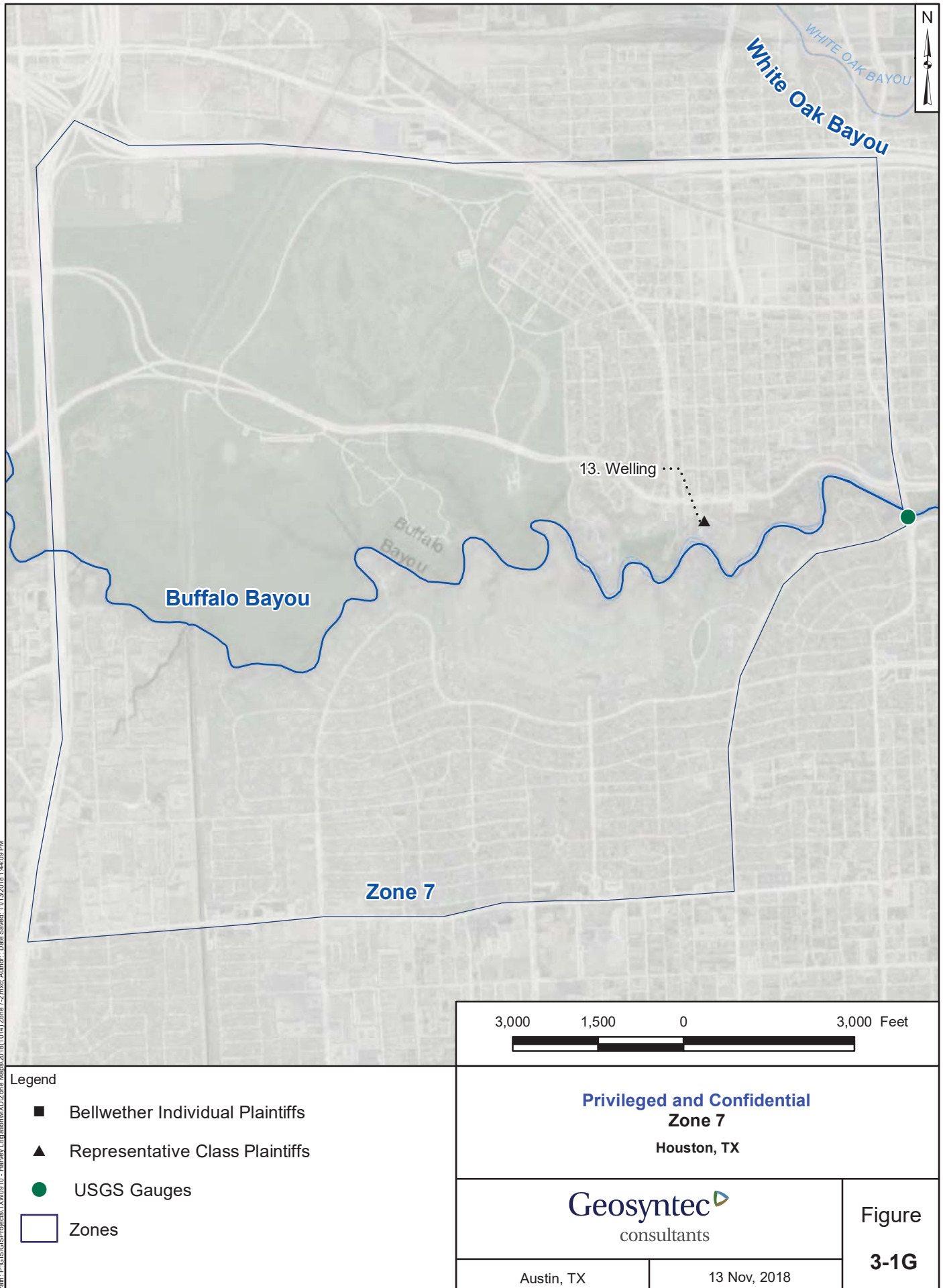












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SECTION 4

TIMELINE OF EVENTS AND OBSERVATIONS

4.1 Introduction

This section presents a brief overview of the reported timeline of events and observations that were analyzed during the development of opinions. Source data, supporting information, and supplemental analyses are provided in subsequent sections of this Report and as separate appendices, where referenced.

4.2 Timeline of Events based on Available Data

Gauge data, downstream test property owner plaintiff testimony, reported USACE gate outflow rates, and the USACE After Action Report (USACE, 2018) were reviewed to develop a general timeline of events and actions taken by the USACE. The timeline summarized in the outline below, together with **Figure 4-1** of the gauge data, establishes reported gate release rates and inundation levels. All reported dates are in 2017 during and following Hurricane Harvey in the Houston area. Property information is based on plaintiff name and number as indicated in **Table 3-1** above along with property inundation reported by the plaintiffs as indicated in **Table 4-1** in the following section.

- August 25 – Harvey makes landfall near Rockport, Texas; approximately one inch of rain falls in the Houston area beginning around 5:00 am
 - Properties reporting initial inundation based on testimony:
 - #11 Azar (minor inundation)
- August 26 – Rain continues, approximately 8.5 inches; pool levels within the reservoirs begin to rise
- August 27 – Rain continues, approximately 15.5 inches
 - Properties reporting initial inundation based on testimony:
 - #3 Memorial SMC (multiple buildings; not all may have been inundated)
 - #10 Beyoglu (reported minor inundation)
- August 27 into 28 – Reservoir gates opened and induced surcharge releases made downstream to Buffalo Bayou; pool levels in the reservoirs continue to rise; approximately 7.5 inches of rain
 - Addicks gates opened at no later than 1:00 am on August 28
 - peak discharge <3,000 cfs
 - peak pool level at 106.59 ft
 - Barker gates opened at no later than 1:15 am on August 28

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- peak discharge <2,700 cfs
 - peak pool level at 100.22 ft
- August 28
 - Properties reporting initial inundation based on testimony:
 - #1 Milton
 - #4 Good Resources
 - #6 Hollis
 - #11 Azar had minor inundation on August 25 but reported significant inundation starting August 28 resulting in up to 9.75 ft of inundation
 - #12 Stahl estimates inundation began on August 28 based on USGS gauges
 - #13 Welling
- August 29 – Uncontrolled releases (also referred to as “flanking flows”) around the spillway on the north end of Addicks occurs; approximately 2.5 inches of rain occurred and stopped
 - Addicks gates remained opened
 - peak discharge <6,500 cfs
 - peak pool level at 108.98 ft
 - uncontrolled releases (flanking flows) started at 7:15 am
 - Barker gates remained opened
 - peak discharge <5,000 cfs
 - peak pool level at 101.53 ft
 - Properties reporting initial inundation based on testimony:
 - #2 Shipos
 - #7 Silverman
 - #8 Godejord
- August 30 – Pool levels in both reservoirs at or near peaks; Barker was 80% full; Addicks was 100% full; no rain occurred
 - Addicks gates remained opened
 - peak discharge <6,400 cfs
 - overall peak pool level at 109.09 ft occurred at 7:00 am
 - uncontrolled releases (flanking flows) also occurred
 - Barker gates remained opened
 - peak discharge <5,000 cfs
 - overall peak pool level at 101.56 ft occurred at 6:00 am
 - Properties reporting initial inundation based on testimony:

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- #5 Aldred
 - #9 Cutts
- August 31 – pool levels begin to fall
 - Addicks gates remained opened
 - peak discharge <5,300 cfs
 - peak pool level at 109.02 ft
 - uncontrolled releases (flanking flows) also occurred
 - Barker gates remained opened
 - peak discharge <4,800 cfs
 - peak pool level at 101.37 ft
- September 1 – pool levels continue to fall
 - Addicks gates remained opened
 - peak discharge <5,300 cfs
 - peak pool level at 108.57 ft
 - uncontrolled releases (flanking flows) stopped around 8:30 pm
 - Barker gates remained opened
 - peak discharge <4,600 cfs
 - peak pool level at 100.80 ft
- September 2 – mandatory evacuation order issued by City of Houston
 - Addicks gates remained opened
 - peak discharge <5,200 cfs
 - peak pool level at 107.90 ft
 - Barker gates remained opened
 - peak discharge <4,600 cfs
 - peak pool level at 100.16 ft
- September 10 – Tailwater conditions ended at Barker
 - Barker tailwater conditions reported to end at elevation 77.28 ft at 7:00 am
- September 11 – Tailwater conditions ended at Addicks
 - Addicks tailwater conditions reported to end at elevation 73.71 ft at 7:00 pm
- September 18 – gate discharge rates ended
 - Addicks – gates closed at 6:15 pm
 - Barker – gates closed at 7:00 pm
- September 19 – gates opened again

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- Addicks – gates opened at 1:15 pm at <2,200 cfs until end of record in “morning report” spreadsheet on 10/13
- Barker – gates opened at 2:45 pm at <1,000 cfs until end of record in “morning report” spreadsheet on 9/25

Figure 4-1 presents a composite general timeline of events from 25 August through 12 September 2017. The gauge number of the four USGS gauges along Buffalo Bayou used in the development of the graph are indicated in the legend. The outflow from the reservoirs represents the composite discharge from the gates of the two reservoirs (Addicks and Barker). The flow rate is based on the USACE reported values per the USACE006304 spreadsheet. The precipitation values are based on an analysis of precipitation data for 44 gauges from 24 August to 30 September 2017 obtained from the HCFCD website (HCFCD, 2018). Thiessen polygons were generated for the precipitation gauges to account for the spatial variability in the precipitation (see **Appendix B**). Each Thiessen polygon was assigned the rain gauge that fell in it. An area weighed total precipitation was calculated based on the precipitation timeseries and area of Thiessen polygons. The precipitation analysis is detailed in **Appendix B**.

4.3 Plaintiff Testimony of Observed Conditions

According to downstream plaintiff testimony, **Table 4-1** below summarizes the reported estimated time of first inundation, the estimate of maximum observed inundation, and the duration/dates when the plaintiff could not access the property due to inundation (which is representative of the time duration that the property was inundated). Based on the testimony summarized in **Table 4-1**, downstream test properties #3, #10, and #11 reported to have minimal inundation prior to the USACE opening the gates.

The Elevation Certificates for each of the downstream test properties were reviewed in order to investigate the slab elevation of the building structure on the property. The slab elevation was compared to the estimate of maximum observed inundation depth according to the plaintiff testimony in order to calculate an estimate of maximum water surface elevation. **Table 4-2** presents the slab elevation and calculated estimate of maximum observed water surface elevation for each of the 13 downstream test properties.

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Table 4-1: Summary of Plaintiff Testimony Regarding Inundation

Number	Plaintiff Name	Estimate of First Inundation	Estimate of Maximum Observed Inundation	Duration Property was Inaccessible
1	Milton, Virginia and Arnold	8/28, 3:00 am	4.33 ft	Until 9/10
2	Shipos, Jennifer	8/29	1.25 ft	Until 9/4
3	Memorial SMC Investment 2013 LP	8/27, late night	5.5 to 6.0 ft	Until 9/11
4	Good Resources LLC	8/28, 11:19 am	3.33 ft	Until 9/10
5	Aldred, Val	8/30	1.5 ft	Until 9/2
6	Hollis, Wayne and Peggy	8/28	3.75 ft	Until 9/9
7	Silverman, Peter and Zhennia	8/29	1.5 ft	Until 9/8
8	Godejord, Arnstein and Igna	8/29	2.83 ft	Until 9/8
9	Cutts, Paul and Dana	8/30, 3:00 am	0.67 ft	Until 9/7
10	Beyoglu, Jana and Gokhan	8/27	2.0 ft on 8/27; up to 4.0 ft on 8/29	Until 9/6
11	Azar, Phillip	8/25	Up to 9.75 ft on 8/28	Until 9/10
12	Stahl, Tim	8/28	3.33 ft	Until 8/29
13	Welling, Shawn	8/28	10.0 ft	Until 9/1

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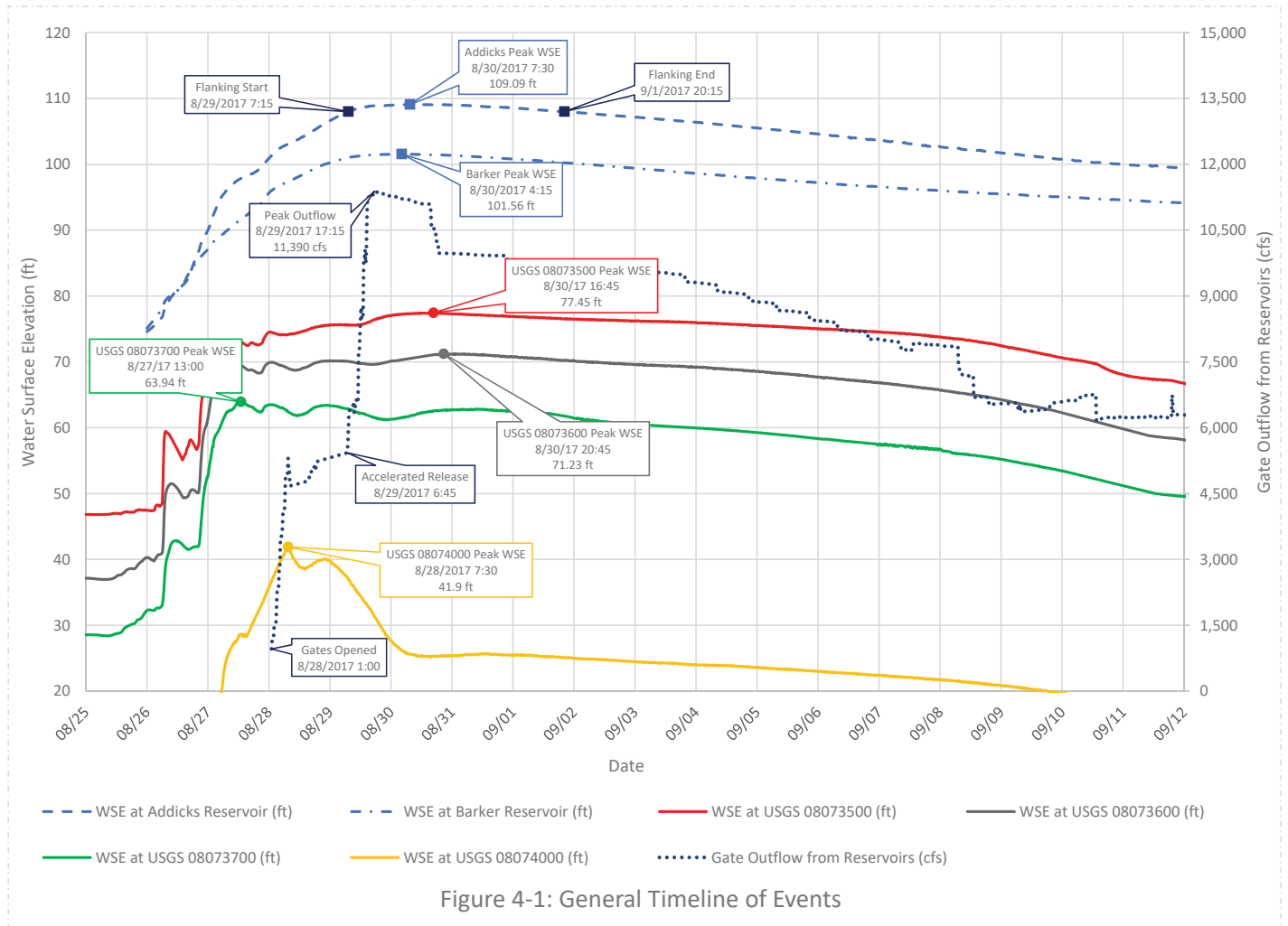
Table 4-2: Slab Elevations and Plaintiff Testimony Regarding Water Surface Elevations

Number	Plaintiff Name	Elevation Certificate Slab Elevation (ft)	Estimate of Maximum Observed Water Surface Elevation (ft)
1	Milton	78.61	82.94
2	Shipos	80.90	85.15
3	Memorial SMC ^a	77.00 to 77.90	83.00 to 83.40
4	Good Resources	78.50	81.83
5	Aldred	80.20	81.70
6	Hollis	76.50	80.25
7	Silverman	75.09 ^b	76.59
8	Godejard	74.00	76.83
9	Cutts	72.00	72.67
10	Beyoglu	70.10	74.10
11	Azar	48.94	58.69
12	Stahl	52.10	55.43
13	Welling	39.40 ^c	49.40

Notes: ^a The #3 Memorial SMC property consists of approximately 15 different building structures which have a range of slab elevations according to their corresponding Elevation Certificates.

^b Elevation Certificate was not available for #7 Silverman although the property had been surveyed with a slab elevation of 75.09 ft by South Texas Surveying Associates, Inc.

^c The slab elevation of 39.40 ft for #13 Welling corresponds to the lowest elevation of machinery or equipment servicing the building; the slab elevation of the first floor is 47.40 ft both of which are reported on the Elevation Certificate. The reported inundation depth based on plaintiff testimony is with respect to the machinery elevation below the first floor elevation.



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SECTION 5

METHODOLOGY OVERVIEW

5.1 Methodology Summary

Several lines of evidence, models, testimony, and data were used to develop the opinions presented in **SECTION 7**. An overview of these methods is described here with specific details discussed in the referenced appendices. As part of these methods, both the reported gate releases during Hurricane Harvey in general accordance with the Induced Surcharge Operations Schedule documented in the 2012 WCM (USACE, 2012) referred to as the “gates opened” scenario, as well as a hypothetical “gates closed” scenario if the USACE had not opened the gates during Hurricane Harvey in accordance with the normal flood control regulation of the 2012 WCM were considered. An overview of hydraulic model results is provided in **SECTION 6**.

5.2 HEC-HMS Model Methodology

Dr. Bedient’s HEC-HMS model, which was modified from the HCFCD HEC-HMS model, was used for this analysis. The hydrologic model results were compared to observed USGS flow data during Hurricane Harvey. Dr. Bedient further modified this HEC-HMS model to consider a gates closed scenario with no flanking flows (i.e., an infinitely large reservoir capacity). The purpose of the HEC-HMS gates closed model was to evaluate and quantify precipitation-only flows within Buffalo Bayou. Flanking flows and where they occur from the reservoirs were quantified using the enhanced 2D HEC-RAS model (see **Section 5.3.1** below).

Dr. Bedient’s HEC-HMS model was modified to include USGS measured flow rates near Addicks and Barker Reservoirs instead of the USACE calculated gate outflow rates. In addition, flanking flows were included where they return to Buffalo Bayou in the HEC-HMS model. The unsteady flow rates within Buffalo Bayou were calculated from these modifications to Dr. Bedient’s HEC-HMS model for the gates opened and gates closed hydraulic model scenarios. The flow rates within Buffalo Bayou are considered “unsteady” since they vary with time. The unsteady flows within Buffalo Bayou obtained from the HEC-HMS model and the flanking flows obtained from the enhanced 2D HEC-RAS model were used as input to the 1D HEC-RAS model for both the gates opened and gates closed scenarios. **Appendix B** presents additional details associated with the development of the HEC-HMS hydrology model.

5.3 HEC-RAS Model Methodology

HEC-RAS models were utilized to predict inundation depths related to the gates opened and gates closed hydraulic model scenarios. In both the gates opened and gates closed scenarios, water within Addicks Reservoir is expected to flank around the ends of the dam when the storage capacity of the reservoir is exceeded, and eventually this water will return to Buffalo Bayou at

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downstream locations. The enhanced 2D HEC-RAS model was used to quantify the amount and identify the location of where the flanking flows return to Buffalo Bayou. The 1D HEC-RAS model was used to quantify the resulting water surface elevation for both scenarios while taking into account the flanking flows for each scenario.

5.3.1 2D HEC-RAS Model

The original 2D HEC-RAS model developed by USACE to analyze the two gate operation scenarios was used as the basis for the 2D HEC-RAS analysis. In particular, model enhancements were made to the USACE 2D HEC-RAS model to gain a general understanding of downstream flow rates and inundation depths. These model enhancements are described in more detail in **Appendix C** with specific modeling results related to flanking flows presented in **Section 6.2**. The enhanced 2D HEC-RAS model was developed to investigate the gates opened and gates closed scenarios primarily to assess when flanking flows are expected to occur under both scenarios, where those flows might be conveyed downstream, and the resulting flow rates and locations where the flanking flows returned to Buffalo Bayou. As further discussed in **Section 6.2** below, the gates closed scenario analysis results in larger flanking flows at Addicks Reservoir, but flanking flows would not have occurred at Barker Reservoir. Furthermore, the enhanced 2D HEC-RAS model is useful for understanding the tools and models available to USACE during Hurricane Harvey for the prediction of downstream inundation.

Although the enhanced 2D HEC-RAS model can provide good estimates of where flanking flows are expected to occur on a specified terrain, the enhanced 2D HEC-RAS model is not as precise in approximating actual flow depths and extent of inundation due to the lack of detailed channel geometry, bridge structures, culvert structures, and other hydraulic controls. Furthermore, HEC-RAS is primarily a hydraulic modeling tool and was not originally developed for detailed hydrologic modeling. Based on these limitations of the 2D HEC-RAS model, a 1D HEC-RAS model was used to explicitly represent the hydraulic controls to approximate flow depths along Buffalo Bayou, along with a HEC-HMS model to conduct hydrologic modeling to predict runoff flow rates into Buffalo Bayou.

5.3.2 1D HEC-RAS Model

Dr. Bedient's 1D HEC-RAS model (Bedient, 2018) for the upper portions of Buffalo Bayou immediately downstream of Addicks and Barker Reservoirs was used for this analysis. Dr. Bedient's 1D HEC-RAS model was combined with the HCFCD 1D HEC-RAS model for the entire length of Lower Buffalo Bayou. The combined 1D HEC-RAS model explicitly represents hydraulic controls and will better approximate flow depths within Buffalo Bayou than the 2D HEC-RAS model. It is our understanding that the basis for Dr. Bedient's 1D HEC-RAS model is the HCFCD regulatory model (HCFCD, 2018a). However, the HCFCD 1D HEC-RAS model is a steady state floodplain model and required minor alterations to allow for unsteady state flows as described in **Appendix B**.

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The 1D HEC-RAS model gates opened scenario was developed to simulate the baseline condition, as it occurred during Hurricane Harvey and approximate the water surface elevation along Buffalo Bayou. The 1D HEC-RAS model gates closed scenario was developed to simulate the alternate condition if the gates had not been opened in accordance with the normal flood control regulation of the 2012 WCM. A single geometry file was used for both scenarios. The hydraulic features, such as bridges and channel geometry, represented in the 1D HEC-RAS model are consistent between the gates opened and gates closed model scenarios. The only difference between the two modeled scenarios is the flow inputs; the flow inputs are described below.

- (i) The unsteady stormwater runoff flow rates from the watershed directly tributary to Buffalo Bayou were obtained from the HEC-HMS model. These flow rates are consistent between the two modeled scenarios.
- (ii) Reservoir release rates reported by USGS gauges from the two reservoirs were used in the gates opened scenario. Under the gates closed scenario, the gates were assumed to have no flow.
- (iii) Uncontrolled flanking flows from Addicks Reservoir when the pool level within the reservoir exceeds the natural ground elevation at the end of the dam were obtained from the enhanced 2D HEC-RAS model for both the gates opened and gates closed scenarios. Each scenario had unique flanking flows that were used in the corresponding modeled scenario.

5.3.3 Evaluation and Comparison of Model Output

The modeled water surface elevation (WSE) from the combined 1D HEC-RAS model was used to support the formulation of each opinion as to which of the 13 downstream test properties were potentially impacted by inundation due to the USACE's decision to open the gates at Addicks and Barker Reservoirs according to the 2012 WCM. The modeled WSE from the combined 1D HEC-RAS model for both scenarios compared to the downstream test property slab elevation allows for an estimation of inundation depth at each downstream test property, as well as an estimate of the inundation duration and timing associated with the gates opened scenario. The model results, together with plaintiff testimony as to observed inundation depths and durations, form the basis of the opinions.

5.4 Analysis of Observed and Reported Conditions Methodology

In order to further support and interpret the combined 1D HEC-RAS modeling results related to inundation depths and durations, other lines of evidence related to inundation at the downstream test properties were investigated and relied upon. The deposition testimony from the 13 downstream property owners (see summary in **Section 4.3**) was reviewed and relied upon in the formulation of each of the opinions. Other information relied upon included the USGS gauge

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information, high water marks collected by multiple agencies, and published information associated with the current FEMA FIS (FEMA, 2017).

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SECTION 6

OVERVIEW OF MODEL RESULTS

6.1 HEC-HMS Model Results

The HEC-HMS model initially prepared by Dr. Bedient as summarized in his expert report (Bedient, 2018) along with the modifications made to this model by Geosyntec as described in **Appendix B** was used to develop the 1D HEC-RAS model inputs. The flow hydrographs reported from the HEC-HMS model, along with the flanking flows obtained from the enhanced 2D HEC-RAS model, were used as the primary flow inputs into the combined 1D HEC-RAS model. At the upstream boundary of the model near the Addicks and Barker Reservoirs, the measured USGS gauge flows are used as the initial input. As flows are added downstream due to either stormwater runoff or flanking flows from Addicks Reservoir, the resulting flow hydrographs are used as input to the 1D HEC-RAS model. A detailed description of the HEC-HMS model development and results are presented in **Appendix B**.

6.2 Enhanced 2D HEC-RAS Model Results

The enhanced 2D HEC-RAS model was developed using the USACE 2D HEC-RAS model as the basis for model development. A detailed description of the model enhancements are provided in **Appendix C**. The purpose of the enhanced 2D HEC-RAS model was to assess when flanking flows would occur, identify where the flows would be conveyed downstream, and quantify flow rates as they returned to Buffalo Bayou.

The enhanced 2D HEC-RAS model quantified the pool levels, flanking flow rates, and the locations of where flanking flows would return to Buffalo Bayou under the two modeling scenarios. **Table 6-1** presents the peak pool levels and flanking flows at Addicks and Barker Reservoirs for the gates closed scenario simulation compared to observed conditions during Hurricane Harvey. Although pool levels within both Addicks and Barker Reservoirs would have been higher under the gates closed scenario, Barker pool levels would still not have exceeded the natural ground at the end of the dam during Hurricane Harvey, thereby avoiding flanking flows. The simulated gates closed scenario pool levels are 1.17 ft and 2.40 ft higher within Addicks and Barker Reservoirs, respectively. Flanking flows were only predicted for Addicks Reservoir under both the gates opened and gates closed scenarios; no flanking flows were predicted for Barker Reservoir under either scenario during Hurricane Harvey. The total peak flanking flow leaving Addicks Reservoir was obtained from the enhanced 2D HEC-RAS model as 5,710 cfs for the gates closed scenario, compared to approximately 2,000 cfs for the gates opened conditions as reported during the Kauffman deposition. These flanking flows are split between the four return locations at Buffalo Bayou and are also attenuated between the end of Addicks Reservoir and the return locations.

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Figure 6-1 and **Figure 6-2** present the observed and modeled outflows and pool levels at Addicks and Barker Reservoirs, respectively. **Figure 6-3** and **Figure 6-4** present the maximum inundation extents from the enhanced 2D HEC-RAS model results for the gates opened and gates closed scenarios, respectively. The gates closed scenario shows no flanking flows occurred for Barker Reservoir. Furthermore, the flanking flows that occur at Addicks Reservoir are shown to be conveyed farther downstream before they return to Buffalo Bayou and bypass many of the downstream test properties. For example, flanking flows from Addicks Reservoir return to Buffalo Bayou via Turkey Creek, Rummel Creek, Spring Branch, and White Oak Bayou.

Table 6-2 below presents the summary of the enhanced 2D HEC-RAS model results; additional model results are presented in **Appendix C**.

6.3 Combined 1D HEC-RAS Model Results

A combined 1D HEC-RAS model was developed using Dr. Bedient's 1D HEC-RAS model and the HCFCF 1D HEC-RAS model. The inflow hydrographs were obtained for the two scenarios from the HEC-HMS model and the flanking flows from the enhanced 2D HEC-RAS model as described in **Section 5.3.2**.

After inputting the HEC-HMS flows for the gates opened scenario, the resulting 1D HEC-RAS produced flow hydrographs are very consistent with the recorded flow hydrographs at four of the USGS gauges along Buffalo Bayou (USGS 08072600 State Hwy 6; USGS 08073500 Near Addicks; USGS 08073600 W Belt Dr; USGS 08073700 Piney Point). As was observed with the HEC-HMS analysis, the gates closed scenario in HEC-RAS produced flow hydrographs that show a very distinct reduction in flow after the time the gates would have opened. To visualize the comparison of the USGS recorded flows, the 1D HEC-RAS gates open flow, and the 1D HEC-RAS gates closed flow; a series of graphical overlays have been prepared and included in **Appendix B**.

A summary of the water surface elevation and the corresponding flow rate at each test property is presented in **Table 6-3** for the two scenarios. Along with the peak water surface elevation, the slab elevation of each test property is indicated. In addition to the peak water surface elevation, the results of the 1D HEC-RAS model were used to evaluate and quantify the time the test property was likely inundated. **Figure 6-5** and the associated sub-figures present the water surface elevation hydrographs near each of the 13 downstream test properties for both scenarios.

6.4 Analysis of Observed and Reported Conditions Results

The combined 1D HEC-RAS hydraulic model results presented in **Table 6-3** together with the deposition testimony for each of the 13 downstream test property plaintiffs presented in **Table 4-1** were used to approximate the inundation depth at each property based on the building slab elevations as presented in **Table 6-4**. Furthermore, **Table 6-5** presents the deposition testimony for the reported duration of inundation at each of the 13 downstream test properties together with

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the modeled duration of inundation based on the duration the gates opened scenario WSE is higher than the peak gates closed scenario WSE. These tables, together with the WSE hydrographs in **Figure 6-5** as well as plaintiff testimony form the basis of opinions.

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Table 6-1: Summary of Gates Closed Enhanced 2D HEC-RAS Model

	Modeled Gates Closed Scenario	Gates Opened Observed Conditions
Addicks Peak Pool Level (ft)	110.26	109.09
Barker Peak Pool Level (ft)	103.96	101.56
Addicks Peak Gate Outflow (cfs)	0	6,440 ^a
Barker Peak Gate Outflow (cfs)	0	4,990 ^a
Addicks Peak Flanking Flow (cfs)	5,710	~2,000 ^b
Barker Peak Flanking Flow (cfs)	0	0
Addicks Timing of Peak Flanking Flow (cfs)	3:45 am on 31 August 2017	7:00 am on 30 August 2017

Notes: ^a The calculated gate outflow rates are based on tailwater conditions reported in the USACE “morning report” spreadsheet; actual gate outflow rates may have been higher according to USGS gauge measurements.

^b The reported flanking flow rate is based on Kauffman deposition.

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Table 6-2: Summary of Enhanced 2D HEC-RAS Model Flanking Flow Results

Inflow Location	Peak Return Flanking Flow for Gates Opened Scenario (cfs)	Peak Return Flanking Flow for Gates Closed Scenario (cfs)
Turkey Creek	955	1,916
Rummel Creek	10	829
Spring Branch	173	1,231
White Oak Bayou	457	1,438

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Table 6-3: Summary of Combined 1D HEC-RAS Model Results – Test Properties

Location	Slab Elevation (ft)	Modeled Gates Opened Peak WSE (ft)	Modeled Gates Closed Peak WSE (ft)	Modeled Gates Open Peak Flow (cfs)	Modeled Gates Closed Peak Flow (cfs)
#1 Milton	78.61	82.78	79.42	4,965	3,797
#2 Shipos	80.90	82.53	79.09	4998	3,709
#3 Memorial SMC ^a	77.00 to 77.90	82.48	79.01	5,016	3,787
#4 Good Resources ^a	78.50	82.43	78.92	5,046	3,933
#5 Aldred	80.20	82.13	78.79	12,133	4,635
#6 Hollis	76.50	80.80	77.38	13,106	8,749
#7 Silverman	75.09	77.81	74.56	13,025	8,299
#8 Godejord	74.00	77.29	74.10	12,994	8,223
#9 Cutts	72.00	72.13	69.79	12,600	8,546
#10 Beyoglu	70.10	67.17	65.96	12,537	10,014
#11 Azar	48.94	55.91	55.91	12,502	11,845
#12 Stahl	52.10	52.22	52.22	17,502	17,502
#13 Welling	39.40	41.87	41.87	20,372	20,372

Notes: ^a #3 Memorial SMC and #4 Good Resources are located along Langham Creek downstream from the Addicks Reservoir outlet structure which is a tributary to Buffalo Bayou. The 1D HEC-RAS model represents Buffalo Bayou and does not include a Langham Creek reach. Therefore, the modeled peak WSE and flows are based on Buffalo Bayou conditions.

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Table 6-4: Summary of Downstream Test Property Inundation Depths

Downstream Test Property	Slab Elevation (ft)	Estimate of Maximum Observed Inundation (ft)	Modeled Gates Opened Peak Inundation (ft)	Modeled Gates Closed Peak Inundation (ft)	Difference Between Gates Opened and Gates Closed WSE (ft)
#1 Milton	78.61	4.33	4.17	0.81	3.36
#2 Shipos	80.90	1.25	1.63	0.00	3.44
#3 Memorial SMC	77.00 to 77.90	5.50 to 6.00	5.48	2.01	3.48
#4 Good Resources	78.50	3.33	3.93	0.42	3.51
#5 Aldred	80.20	1.50	1.93	0.00	3.34
#6 Hollis	76.50	3.75	4.30	0.88	3.42
#7 Silverman	75.09	1.50	2.72	0.00	3.25
#8 Godejord	74.00	2.83	3.29	0.10	3.19
#9 Cutts	72.00	0.67	0.13	0.00	2.34
#10 Beyoglu	70.10	4.00	0.00	0.00	1.21
#11 Azar	48.94	9.75	6.97	6.97	0.00
#12 Stahl	52.10	3.33	0.12	0.12	0.00
#13 Welling	39.40	10.00	2.47	2.47	0.00

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Table 6-5: Summary of Downstream Test Property Inundation Durations

Downstream Test Property	Reported Inundation Duration (days)	Modeled Gates Closed Peak WSE (ft)	Duration of Gates Opened WSE Greater Than Gates Closed Peak WSE (days)
#1 Milton	12.9	79.42	13.4
#2 Shipos	6.0	79.09	13.4
#3 Memorial SMC	14.0	79.01	13.5
#4 Good Resources	12.5	78.92	13.5
#5 Aldred	3.0	78.79	12.8
#6 Hollis	12.0	77.38	13.2
#7 Silverman	10.0	74.56	13.2
#8 Godejord	10.0	74.10	13.2
#9 Cutts	7.9	69.79	9.6
#10 Beyoglu	10.0	65.96	5.3
#11 Azar	16.0	N/A	12.1 ^a
#12 Stahl ^b	1.0	N/A	N/A
#13 Welling ^b	4.0	N/A	N/A

Notes: ^a The “Duration of Gates Opened WSE Greater Than Gates Closed Peak WSE (days)” for #12 Azar was calculated as the duration from when the gates closed WSE receded below the slab elevation to the time when the gates opened WSE receded below the slab elevation.

^b Although the gates opened scenario inundation duration is expected to be longer than the gates closed scenario for properties #12 Stahl and #13 Welling, the longer duration is dependent on the selected elevation. In general, Figures 6-5L and 6-5M show an increase in the inundation duration on the order of up to twelve days depending on the selected elevation.

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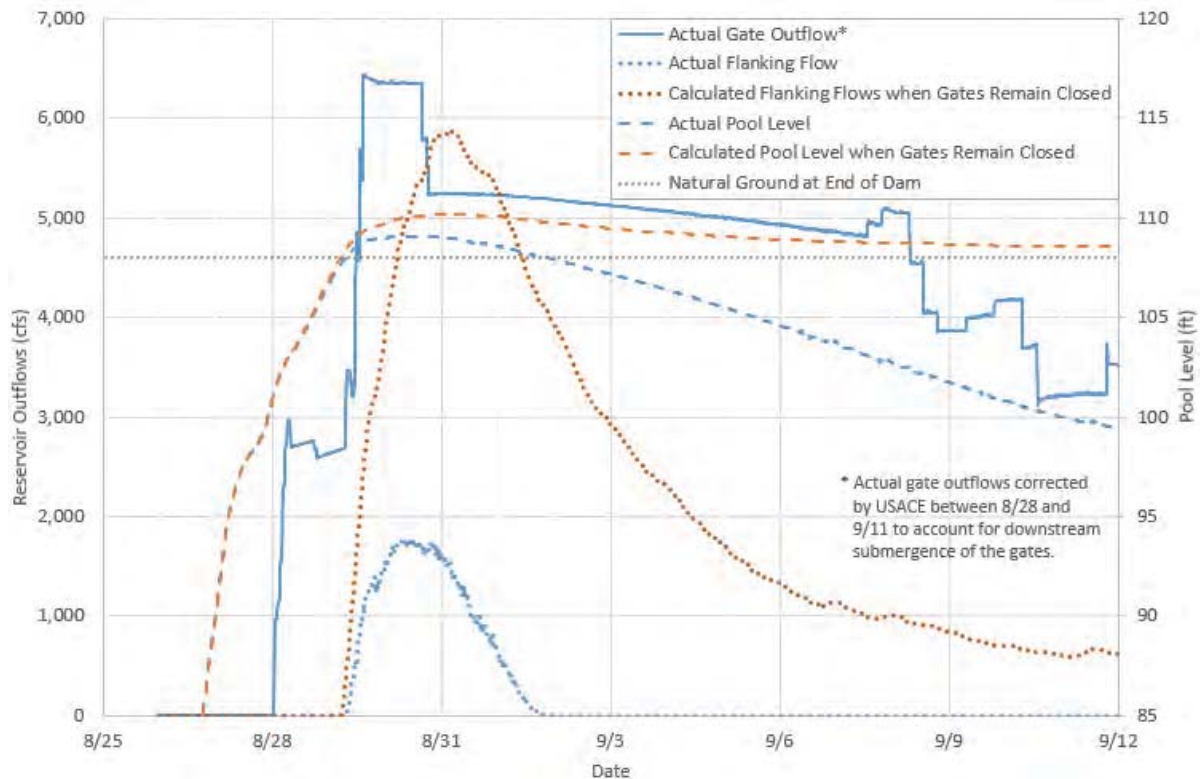


Figure 6-1: Observed and Simulated Outflows and Pool Levels at Addicks Reservoir

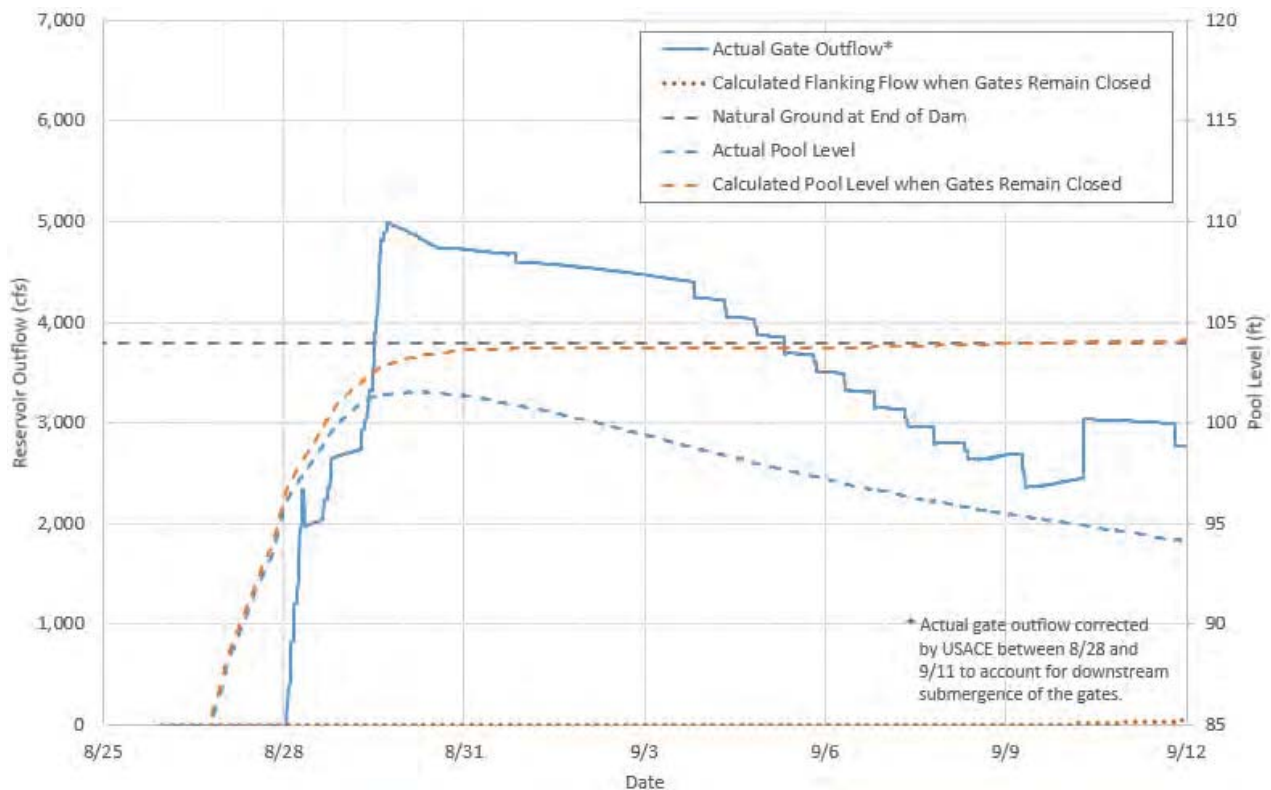
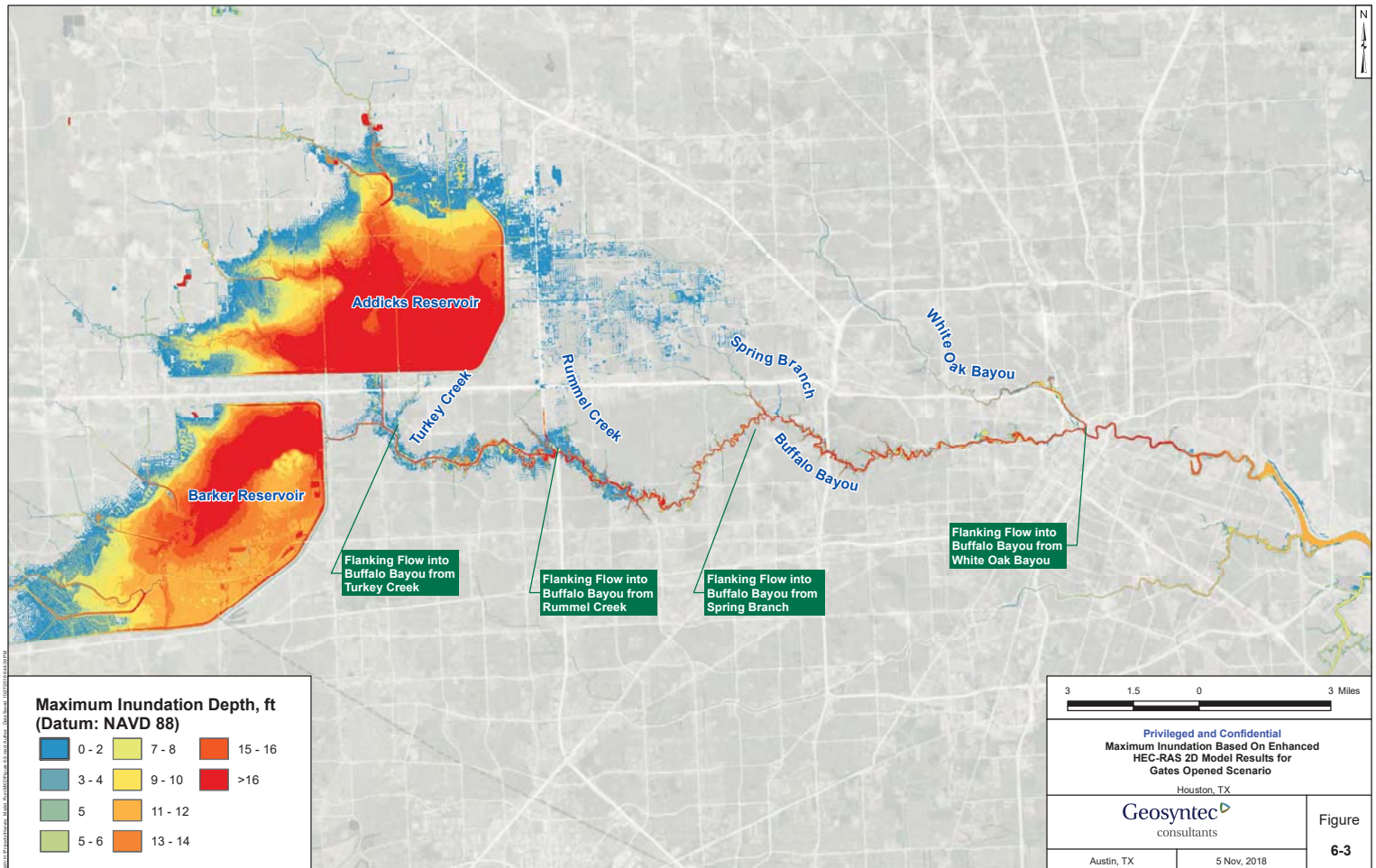
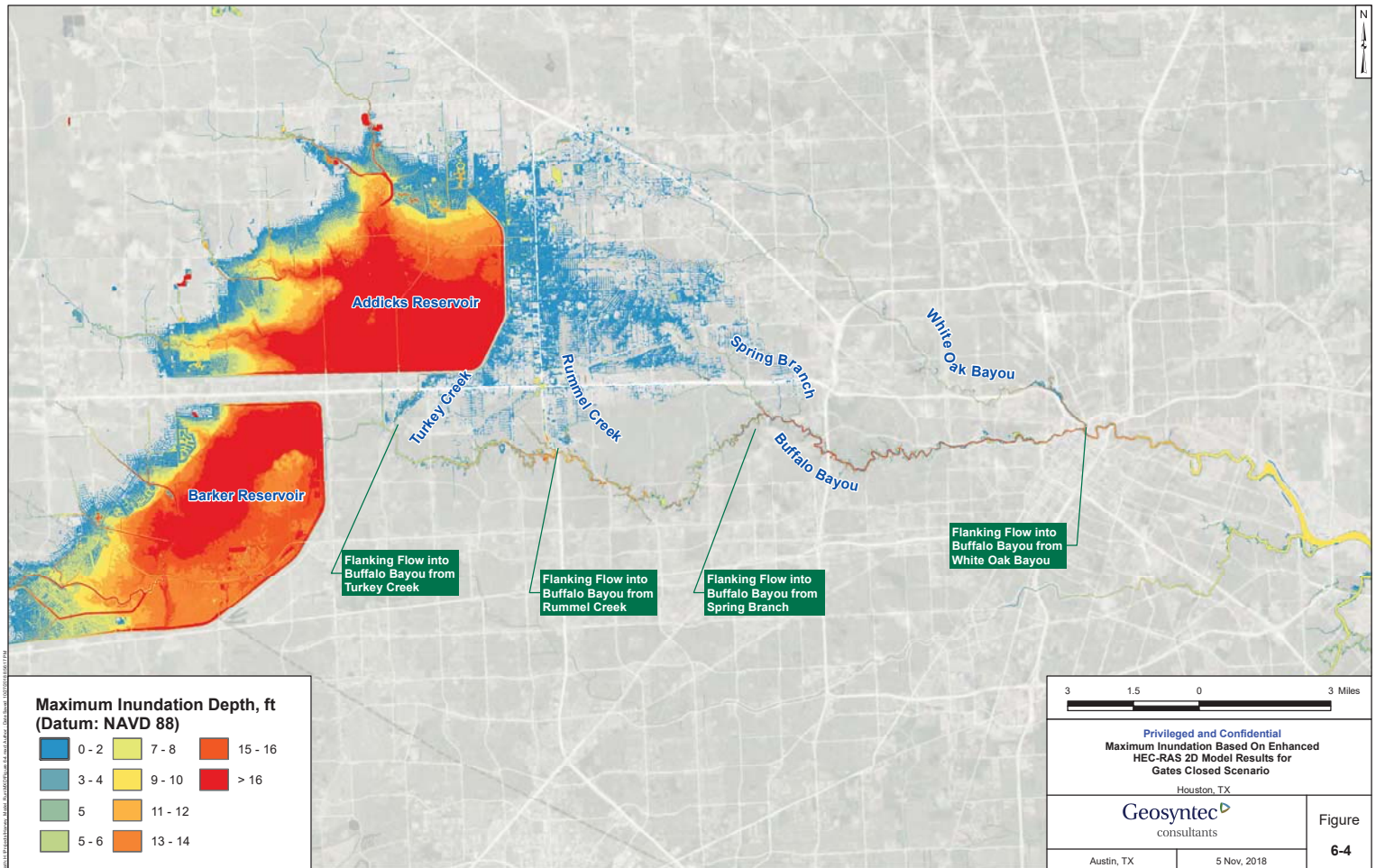


Figure 6-2: Observed and Simulated Outflows and Pool Levels at Barker Reservoir





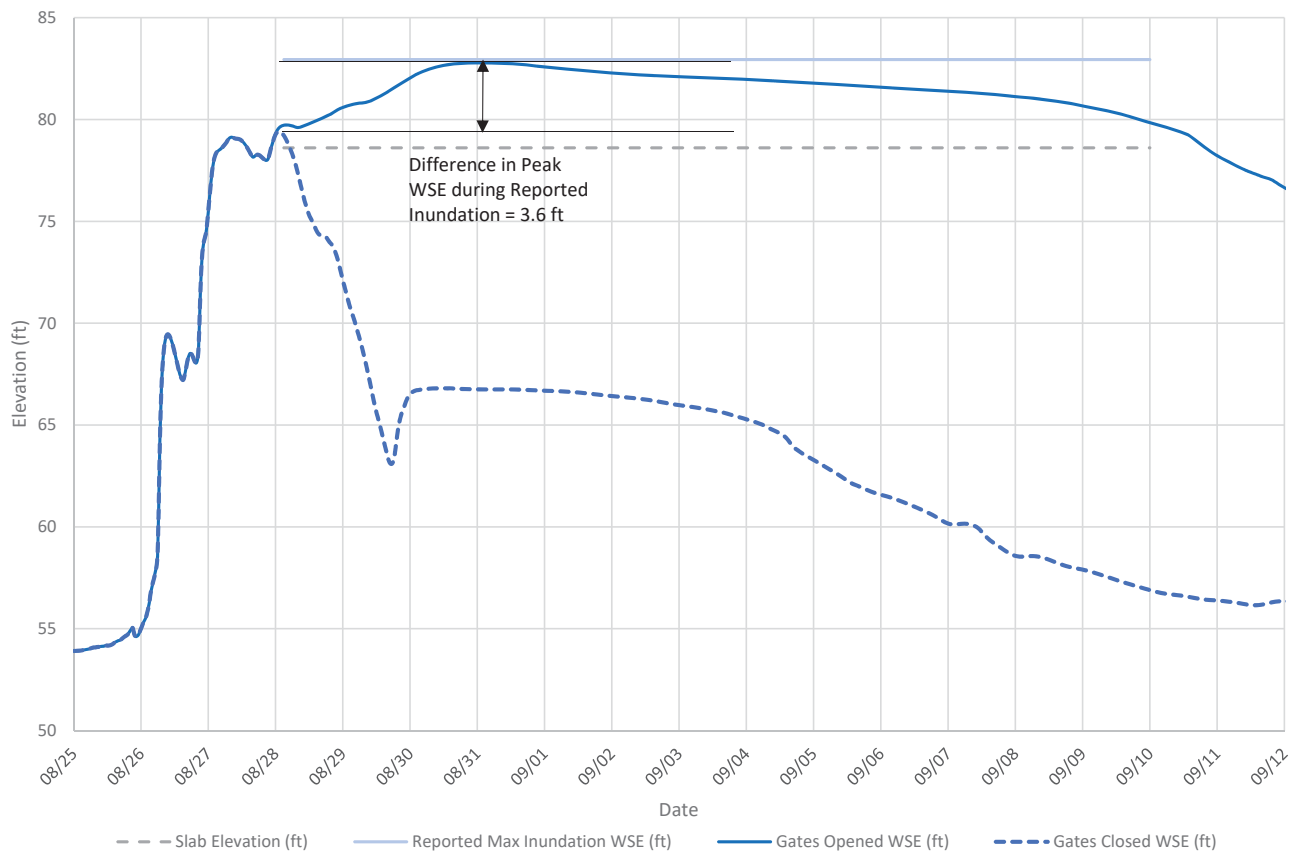


Figure 6-5A: Elevation Hydrograph for #1 Milton

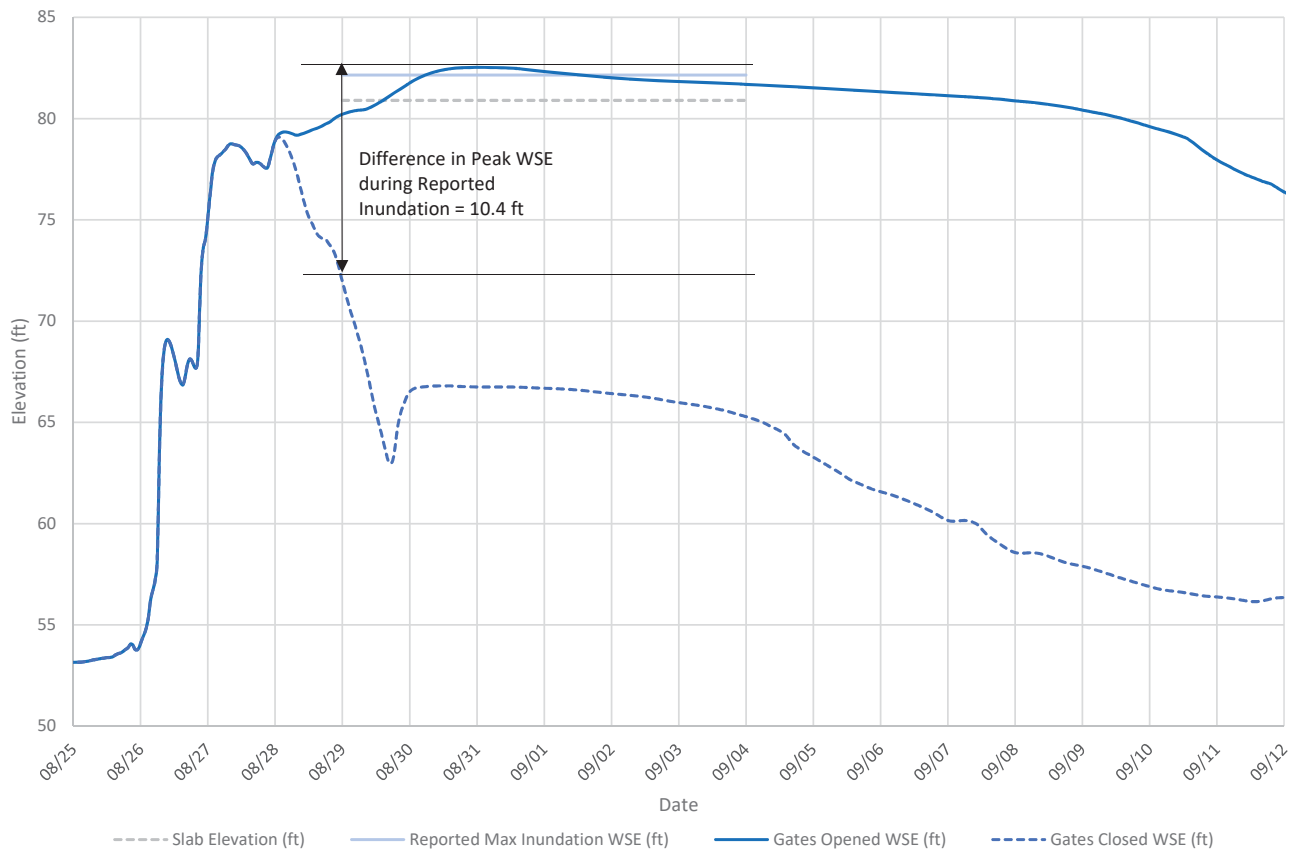


Figure 6-5B: Elevation Hydrograph for #2 Shipos

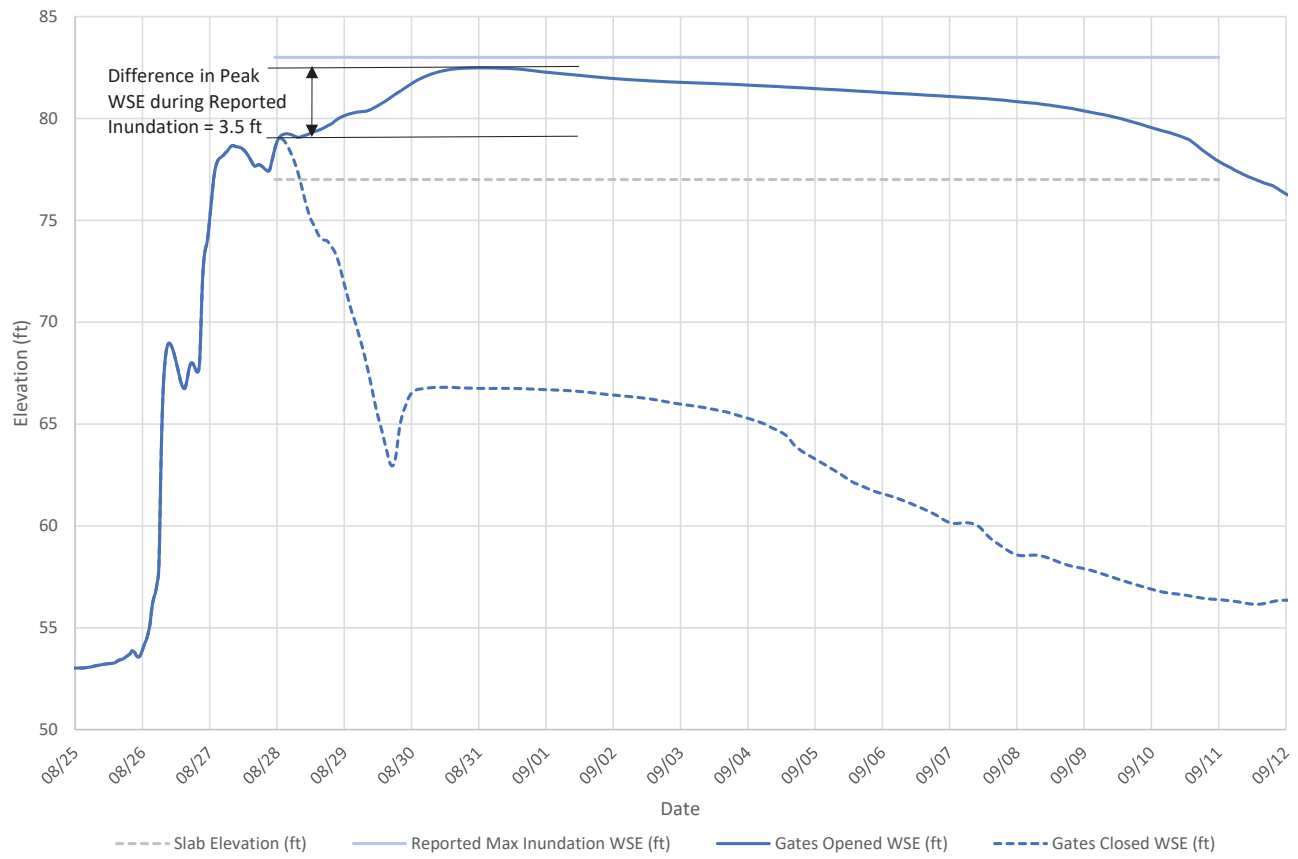


Figure 6-5C: Elevation Hydrograph for #3 Memorial SMC

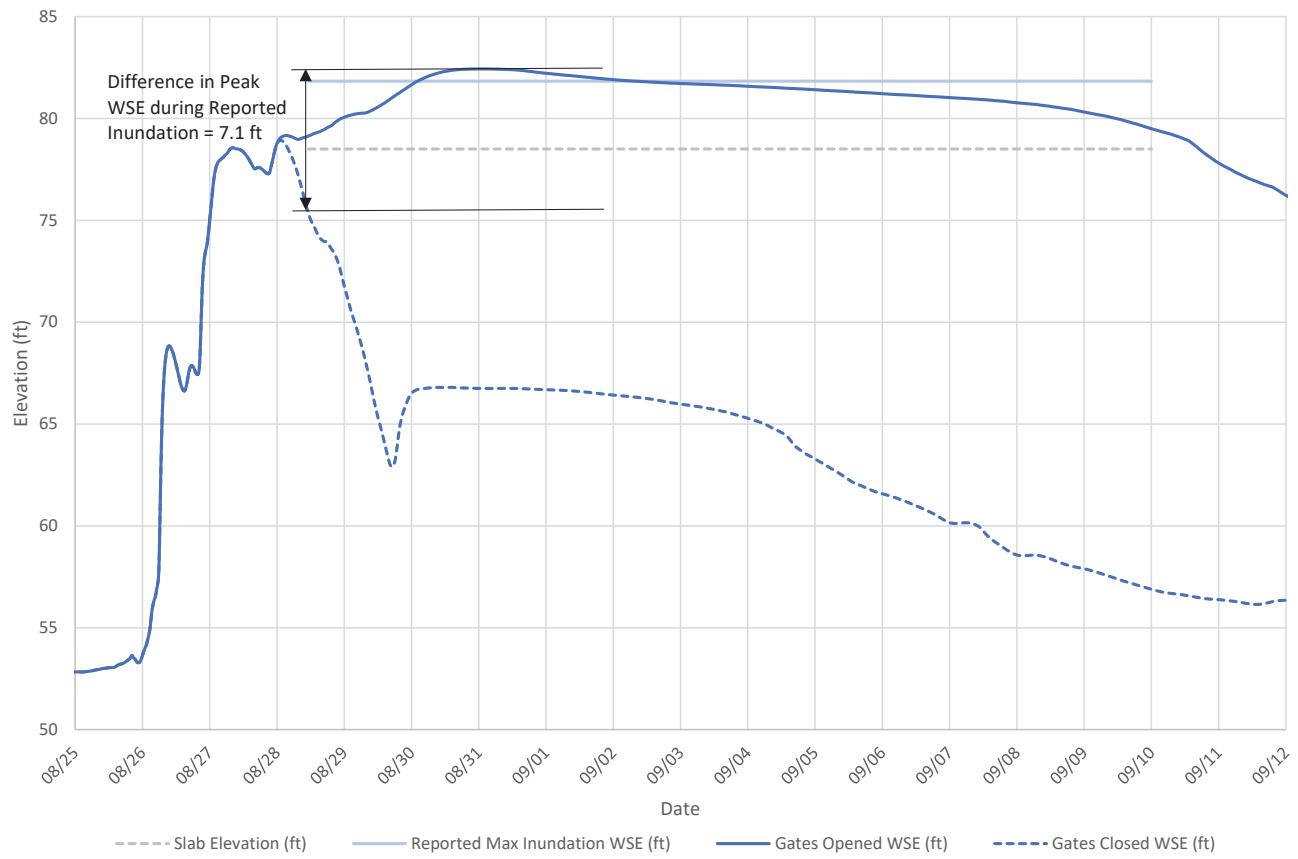


Figure 6-5D: Elevation Hydrograph for #4 Good Resources

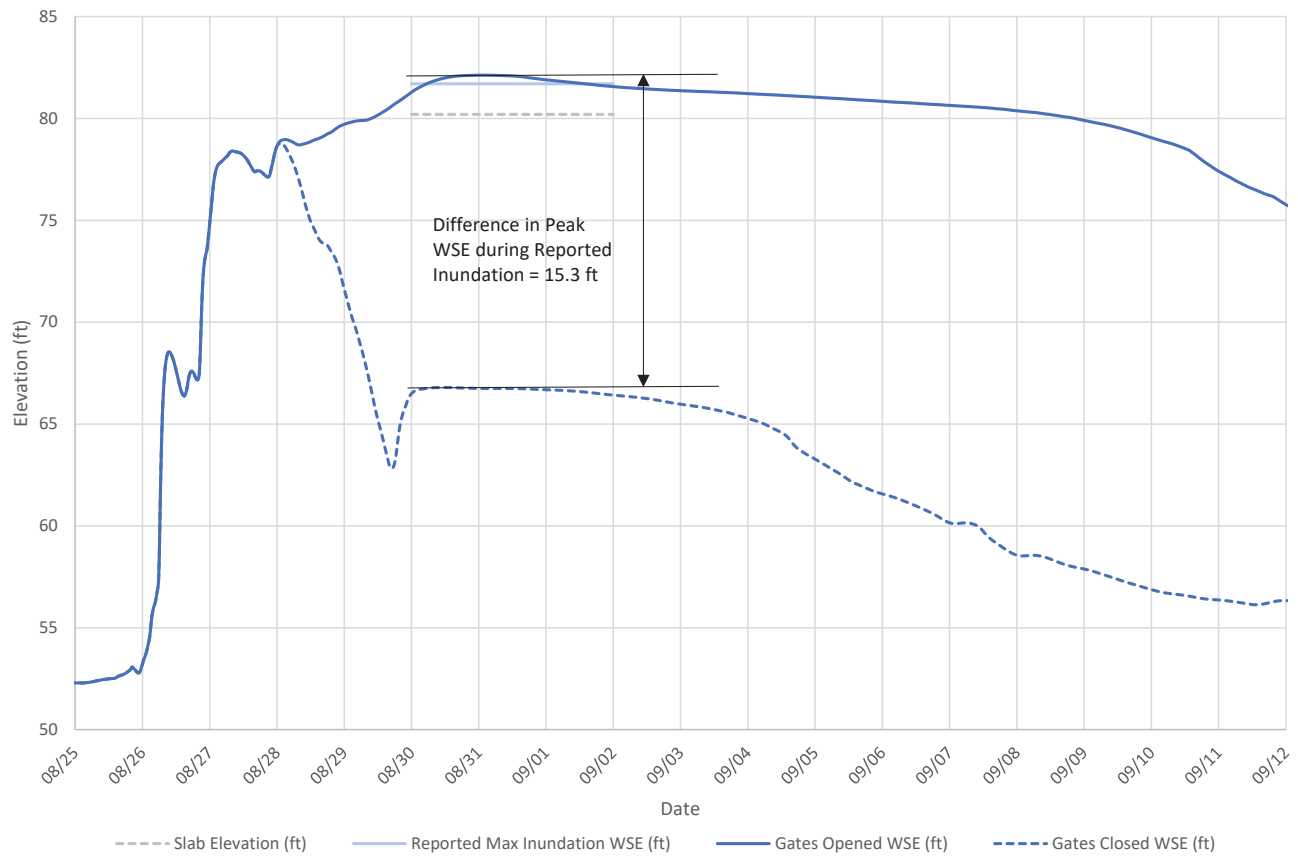


Figure 6-5E: Elevation Hydrograph for #5 Aldred

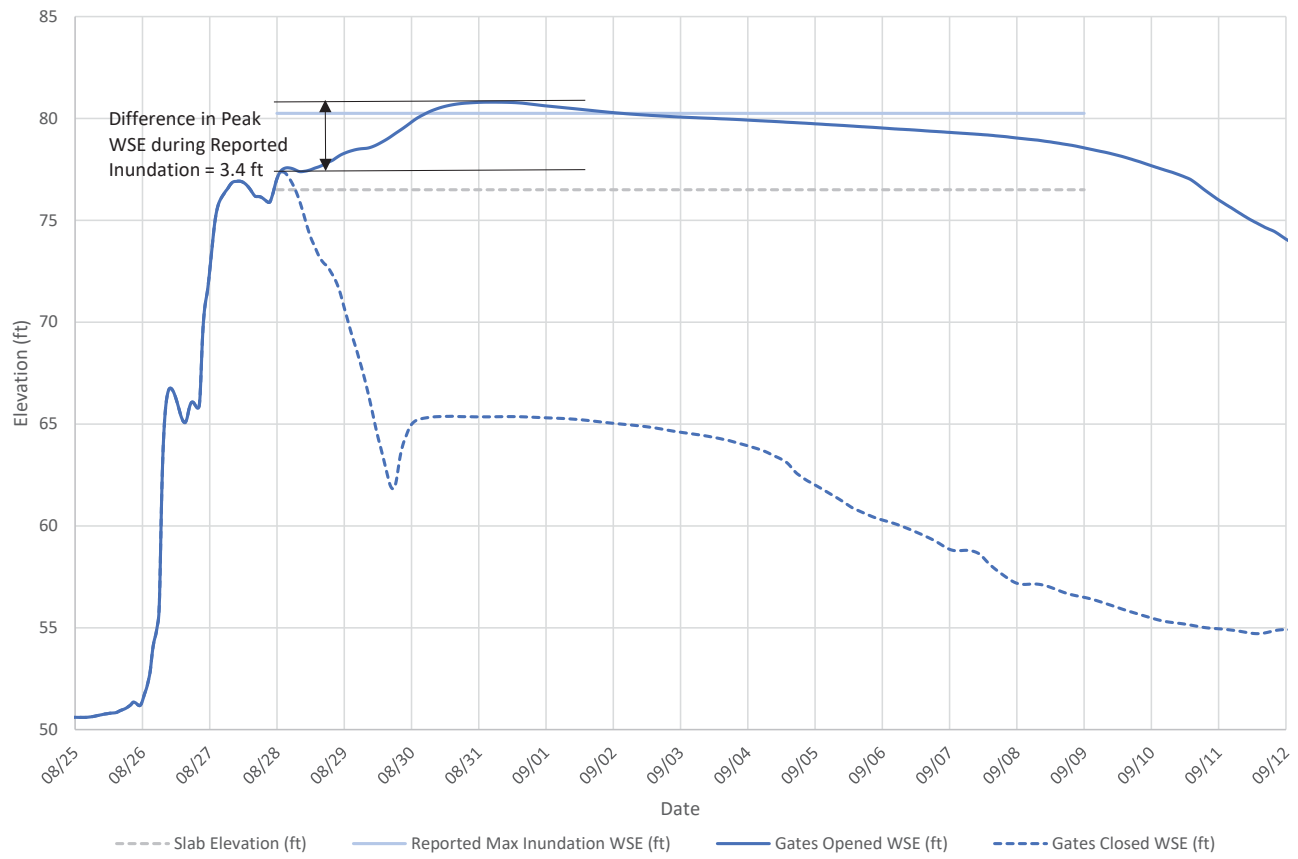


Figure 6-5F: Elevation Hydrograph for #6 Hollis

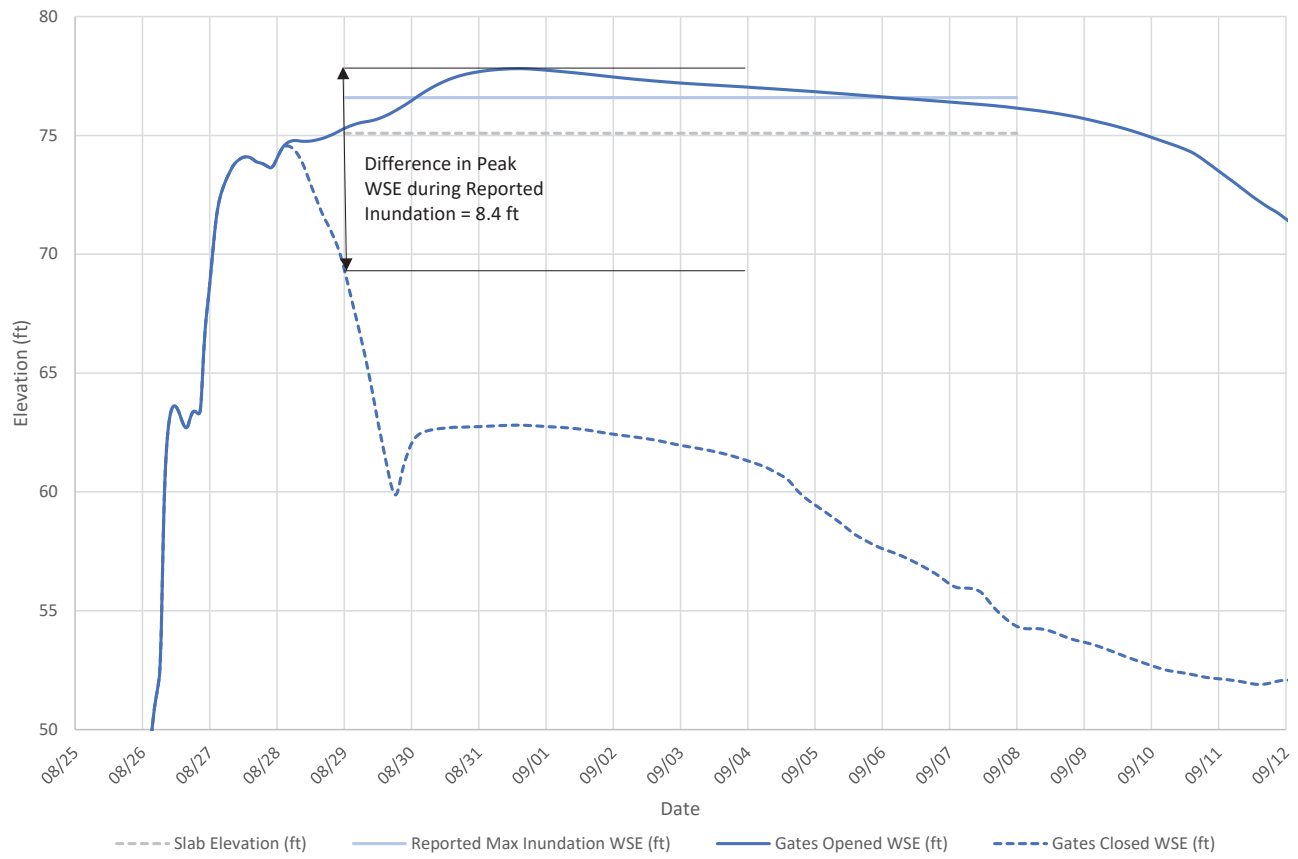


Figure 6-5G: Elevation Hydrograph for #7 Silverman

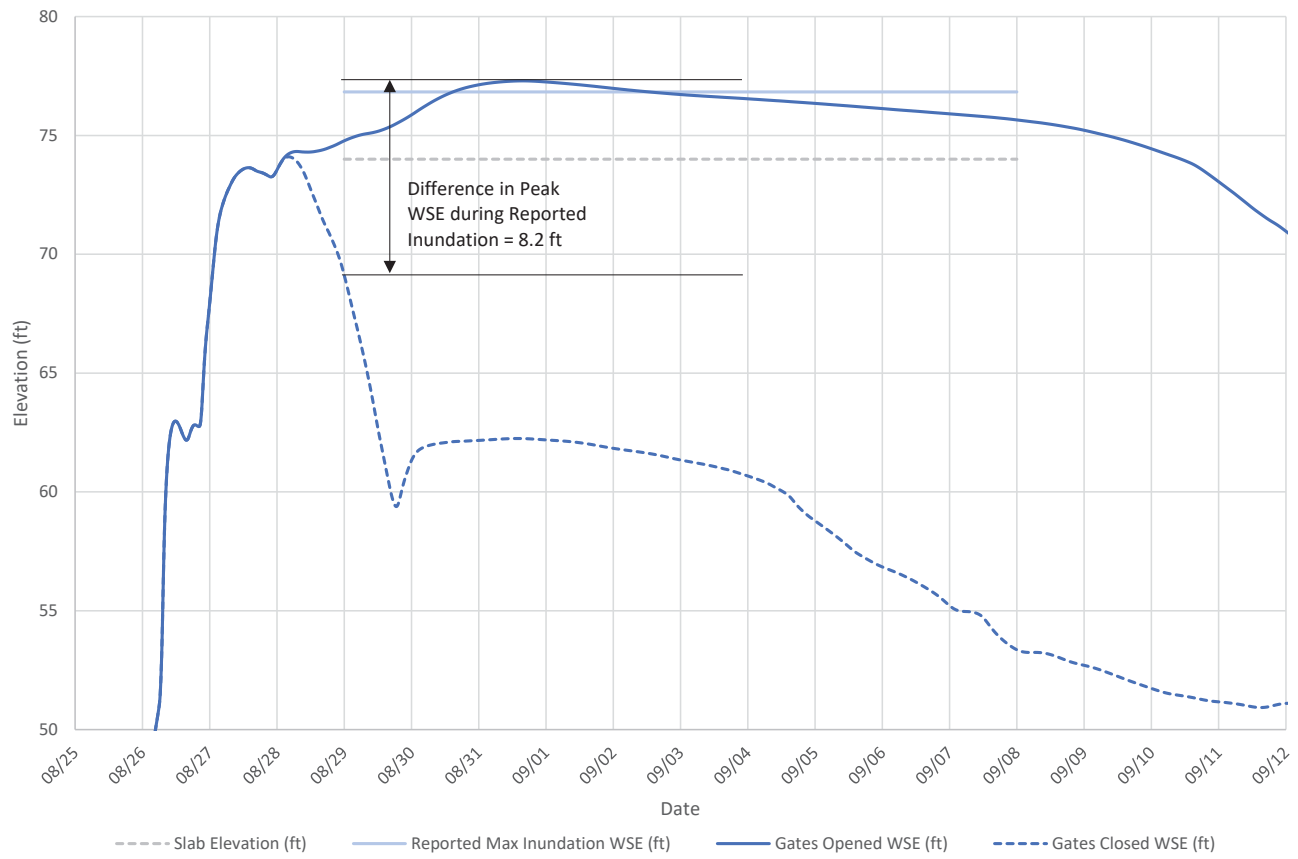


Figure 6-5H: Elevation Hydrograph for #8 Godejord

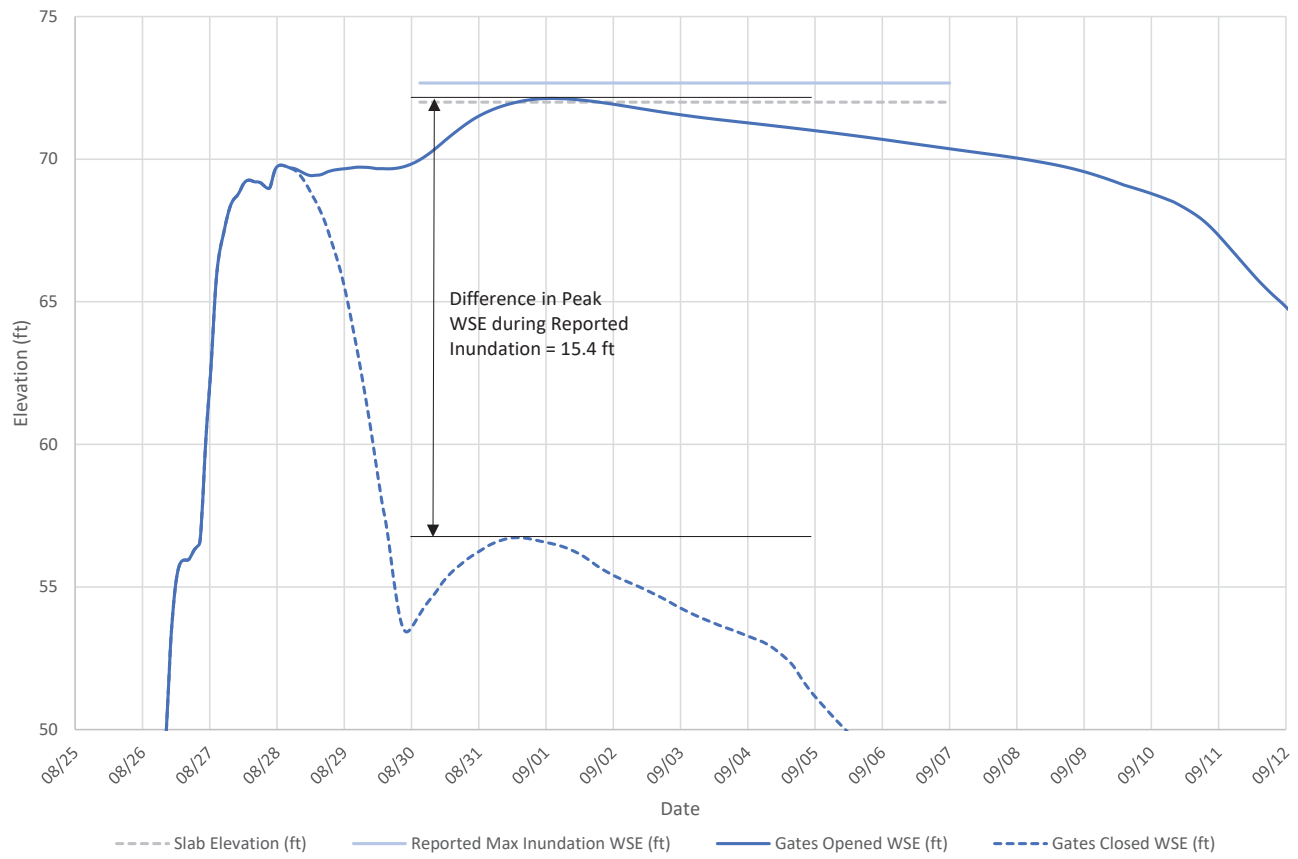


Figure 6-5I: Elevation Hydrograph for #9 Cutts

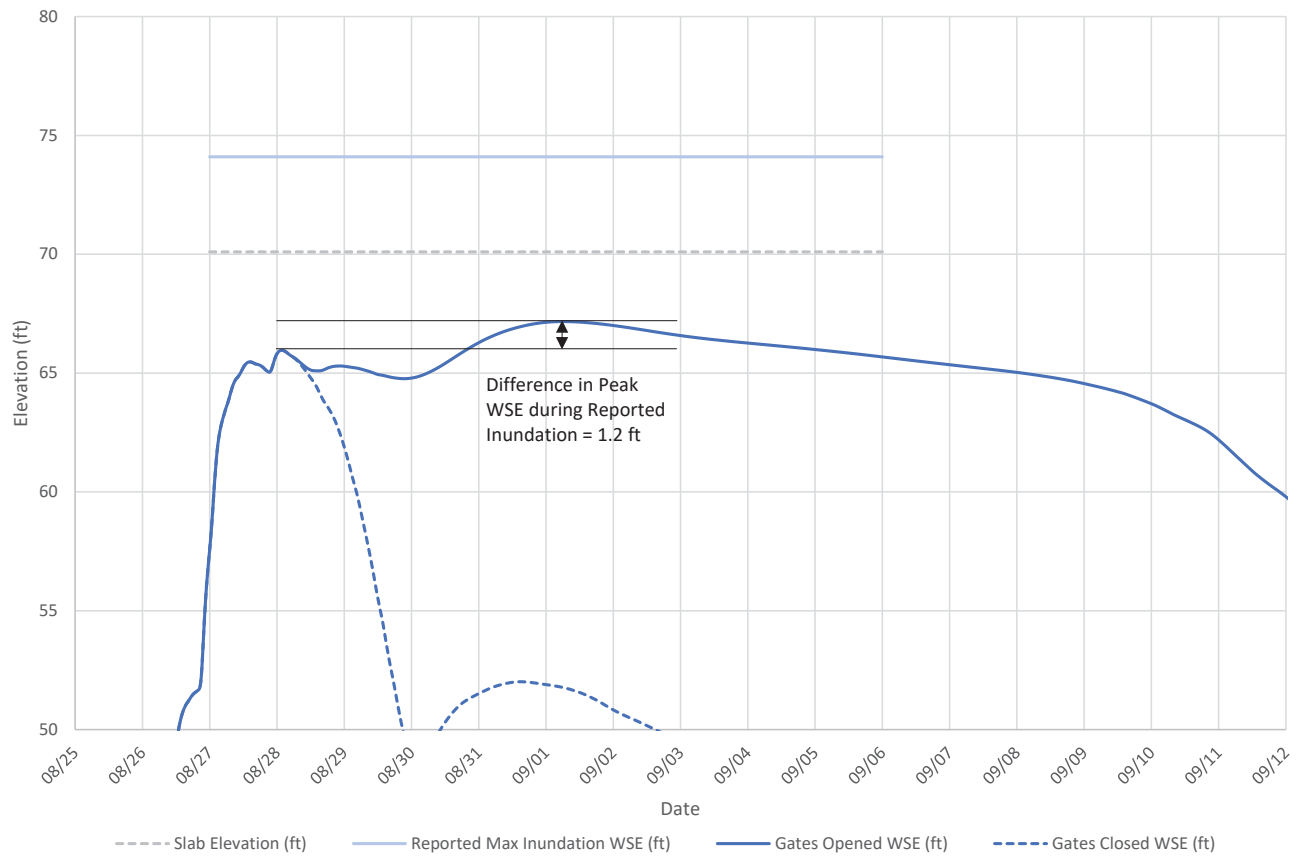


Figure 6-5J: Elevation Hydrograph for #10 Beyoglu

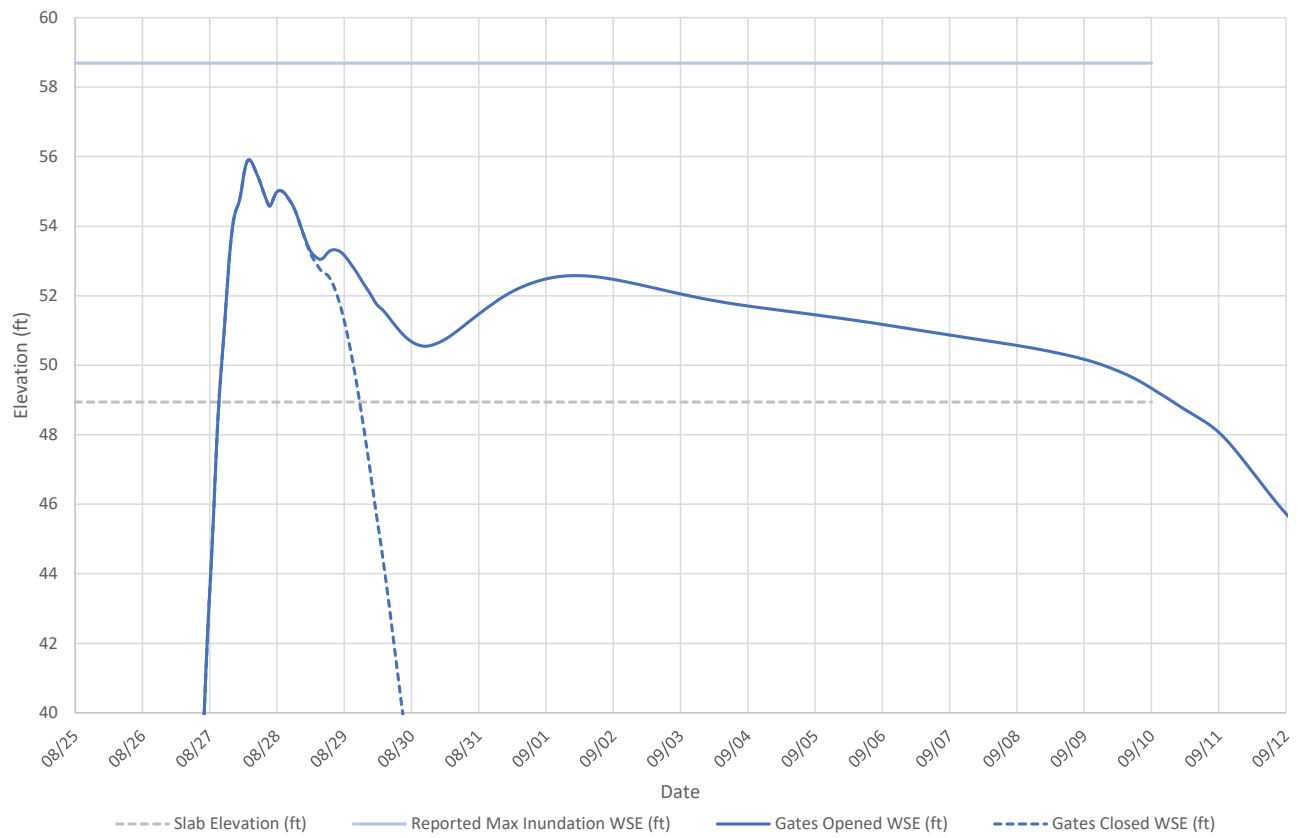


Figure 6-5K: Elevation Hydrograph for #11 Azar

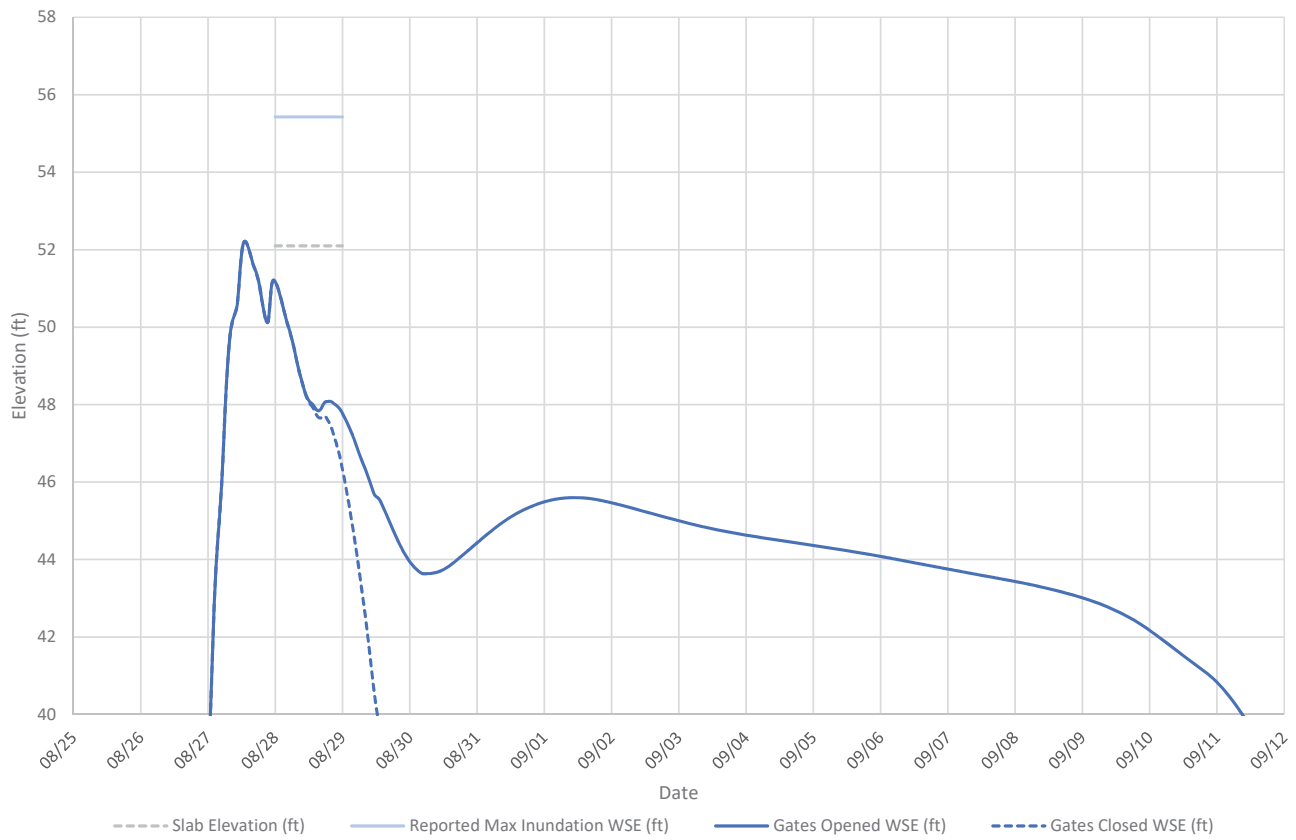


Figure 6-5L: Elevation Hydrograph for #12 Stahl

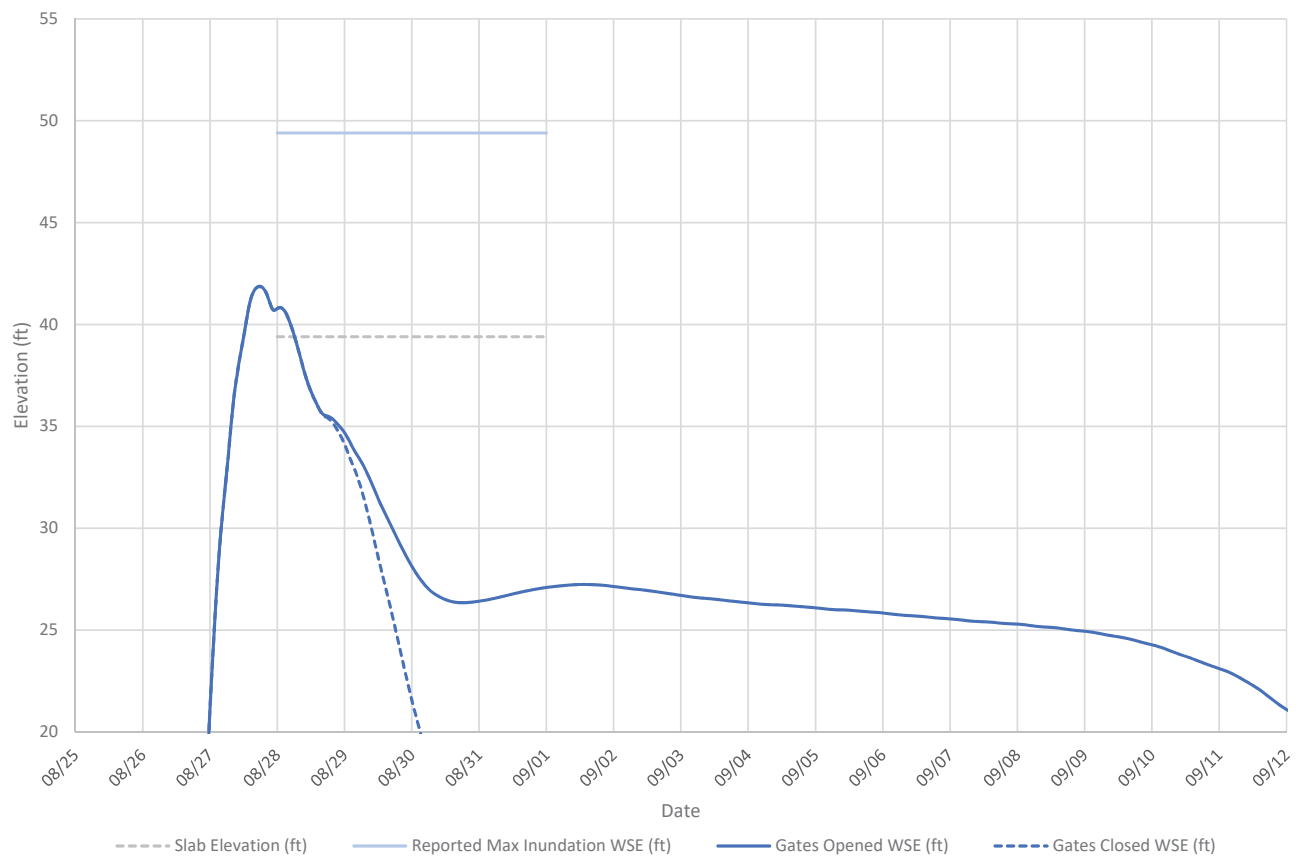


Figure 6-5M: Elevation Hydrograph for #13 Welling

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SECTION 7

INITIAL OPINIONS ON PROPERTY INUNDATION

7.1 Opinion 1: Effect of Opening the Gates

The gates opened scenario based on the actual gate openings in general accordance with the 2012 WCM was compared to the gates closed scenario. Utilizing estimated inflow rates into the reservoirs, calculated storage volumes behind the dams, and calculated outflow rates (from either the gate openings or the dam flanking flows), the pool levels and flanking flows were investigated. Hydraulic modeling results comparing the gates opened and gates closed model scenarios are presented in **Table 6-4** and **Figure 6-5**. The opinions presented below were formulated using these model results, deposition testimony, and the additional information presented in this report.

In my opinion, the USACE's decision to open the gates in general accordance with the 2012 WCM significantly increased downstream flows within Buffalo Bayou during Hurricane Harvey. Based on the hydraulic model results and deposition testimony, the 13 downstream test properties were adversely impacted as a result of the USACE's decision to implement the induced surcharge operation schedule according to the 2012 WCM.

The resulting impact was to cause additional inundation to downstream properties along Buffalo Bayou, including the 13 downstream test properties.

7.2 Opinion 2: Inundation of Properties in Zone 1

7.2.1 Property 1 – Milton

The property located at 850 Silvergate Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 4.33 ft of water above the building slab elevation of 78.61 ft beginning approximately 3:00 am on 28 August 2017 and lasting until approximately 10 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.78 ft. The gates closed model scenario results in a modeled water surface elevation of 79.42 ft.

The plaintiff reported that inundation of the property did not occur until after 3:00 am on 28 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.81 ft (9.7 in) prior to gates opening; however, this is within the model's uncertainty for this location. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. **In considering the plaintiff's testimony and the results of the model, it is my opinion that the plaintiff's reported inundation depth and associated damage to the property**

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was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.

7.2.2 Property 2 – Shipos

The property located at 931 Bayou Parkway was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 1.25 ft of water above the building slab elevation of 80.90 ft beginning on or about 29 August 2017 and lasting until approximately 4 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.53 ft. The gates closed model scenario results in a modeled water surface elevation of 79.09 ft.

The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the modeling, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.2.3 Property 3 – Memorial SMC

The property located at 777 S. Mayde Creek Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was initially inundated beginning late on the night of 27 August 2017 with approximately 6 to 8 inches of water. A maximum inundation depth of 5.5 to 6.0 ft of water above the building slab elevations that range from 77.0 ft to 77.9 ft, with inundation lasting until 11 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.48 ft. The gates closed model scenario results in a modeled water surface elevation of 79.01 ft.

The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 12 to 20 inches prior to gates opening; however, this is within the model's uncertainty for this location. Based on the plaintiff's testimony regarding observed inundation depth, it is reasonable that the property would have had a lower inundation depth prior to the gates opening, and the model results are reasonably consistent with observed conditions. In addition to the model results showing a distinct rise in the water surface elevation after the gates were opened, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. **It is my opinion that a substantial increase in inundation depth (on the order of 3.5 to 5.5 ft) above the plaintiff's observed inundation depth on the far northeast corner of the property late in the evening of 27 August 2017, and that a substantial increase in duration of inundation (on the**

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order of 13 days) from a modeled duration of less than one day under the gates closed scenario, was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM, and that such additional inundation and associated damage to the property would not have occurred if the gates had remained closed.

7.2.4 Property 4 – Good Resources

The property located at 760 Memorial Mews Street #4 was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 3.33 ft of water above the building slab elevation of 78.50 ft beginning approximately 11:19 am on 28 August 2017 and lasting until approximately 10 September 2017. The gates opened model scenario results indicates a modeled water surface elevation of 82.43 ft. The gates closed model scenario indicates a modeled water surface elevation of 78.92 ft.

The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario with approximately 3.5 ft of inundation, consistent with the testimony. The plaintiff reported that inundation of the property did not occur until after 11:00 am on 28 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.42 ft (5.0 in) prior to gates opening; however, this is within the model's uncertainty for this location. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's property would not have been inundated under a gates closed scenario and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.3 Opinion 3: Inundation of Properties in Zone 2

7.3.1 Property 5 – Aldred

The property located at 835 Thornvine Lane was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 1.5 ft of water above the building slab elevation of 80.20 ft beginning on approximately 30 August 2017 and lasting until approximately 2 September 2017. The gates opened model scenario results in a modeled water surface elevation of 82.13 ft. The gates closed model scenario results in a modeled water surface elevation of 78.79 ft.

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The 1D HEC-RAS model results show the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.3.2 Property 6 – Hollis

The property located at 14914 River Forest Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 3.75 ft of water above the building slab elevation of 76.50 ft beginning on approximately 28 August 2017 and lasting until approximately 9 September 2017. The gates opened model scenario results in a modeled water surface elevation of 80.80 ft. The gates closed model scenario results in a modeled water surface elevation of 77.38 ft.

The plaintiff reported that inundation of the property did not occur until 28 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.88 ft (10.6 in) prior to gates opening; however, this is within the model's uncertainty for this location. Based on the plaintiff's testimony regarding observed inundation depth, it is reasonable that the property would not have flooded prior to the gates opening, and the model results are reasonably consistent with observed conditions. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.4 Opinion 4: Inundation of Properties in Zone 3

7.4.1 Property 7 – Silverman

The property located at 12515 Westerley Lane was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 1.5 ft of water above the building slab elevation of 75.09 ft beginning on approximately 29 August 2017 and lasting until approximately 8 September 2017. The gates opened model scenario results in a modeled water surface elevation of 77.81 ft. The gates closed model scenario results in a modeled water surface elevation of 74.56 ft.

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The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.4.2 Property 8 – Godejord

The property located at 14334 Heatherfield Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 2.83 ft of water above the building slab elevation of 74.00 ft beginning on approximately 29 August 2017 and lasting until approximately 8 September 2017. The gates opened model scenario results in a modeled water surface elevation of 77.29 ft. The gates closed model scenario results in a modeled water surface elevation of 74.10 ft.

The plaintiff reported that inundation of the property did not occur until 29 August 2017, which was after the gates were opened under the induced surcharge protocol. The 1D HEC-RAS model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model indicates an inundation depth of approximately 0.10 ft (1.2 in) prior to gates opening; however, this is within the model's uncertainty for this location. Based on the plaintiff's testimony regarding observed inundation depth, it is reasonable that the property would not have flooded prior to the gates opening, and the model results are consistent with observed conditions. In addition, the model shows the property would have remained significantly inundated for an extended period of time as a result of the induced surcharge. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.5 Opinion 5: Inundation of Properties in Zone 4

7.5.1 Property 9 – Cutts

The property located at 311 Blue Willow Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 0.67 ft of water above the building slab elevation of 72.00 ft beginning around 3:00 am on 30 August 2017 and lasting until approximately 7 September 2017. The gates opened model scenario results in a modeled water surface elevation of 72.13 ft. The gates closed model scenario results in a modeled water surface elevation of 69.79 ft.

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The 1D HEC-RAS model results indicate the building slab would have been inundated under the gates opened scenario and would not have been inundated under the gates closed scenario. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and associated damage to the property was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM and that inundation of and associated damage to the property would not have occurred if the gates had remained closed despite the model results over estimating the WSE at the property.**

7.6 Opinion 6: Inundation of Properties in Zone 5

7.6.1 Property 10 – Beyoglu

The property located at 107 Warrenton Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony which stated the property was inundated with up to 4.0 ft of water above the building slab elevation of 70.10 ft beginning on 27 August 2017 with approximately 2.0 ft of inundation and rising to 4.0 ft on 29 August 2017 and lasting until approximately 5 September 2017. The gates opened model scenario results in a modeled water surface elevation of 67.17 ft. The gates closed model scenario results in a modeled water surface elevation of 65.96 ft.

The plaintiff reported that inundation of the property occurred on 27 August 2017, which was before the gates were opened under the induced surcharge protocol, but this inundation depth increased by an additional 2.0 ft on 29 August 2017, after the gates were opened. The 1D HEC-RAS model indicates a water surface elevation under both scenarios below the reported slab elevation. At this distance downstream from the reservoirs along Buffalo Bayou, the model is consistently under predicting the observed water surface elevations. However, the model results show a distinct rise in the water surface elevation after the gates were opened, which reasonably explains the flood inundation at the plaintiff's property. The model results of WSE after this time indicates a peak difference in WSE between the two scenarios of 1.2 ft. In considering the plaintiff's testimony and the results of the model, **it is my opinion that the plaintiff's reported inundation depth and timing is attributable to the difference in WSE between the two scenarios after the reported start of inundation; as result, the inundation of and associated damage to the property is attributed to the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM despite the model results under estimating the WSE at the property.**

7.7 Opinion 7: Inundation of Properties in Zone 6

7.7.1 Property 11 – Azar

The property located at 3 Magnolia Bend Drive was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony. The plaintiff

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testified that inundation of the property began on 25 August 2017 but was limited to the garage until 28 August 2017 when the entire first floor of the property was inundated. The plaintiff testified that the maximum inundation on the property was up to 9.75 ft (i.e., 117 inches) of water above the building slab elevation of 48.94 ft and lasting until approximately 8 September 2017.

At this location downstream of the reservoirs, the gates opened and gates closed model scenarios indicate very similar peak flow rates within Buffalo Bayou and modeled water surface elevations of approximately 55.91 ft. However, the model shows a very distinct difference in the sustained flow rate within Buffalo Bayou when comparing the gates opened and gates closed scenarios. The modeled gates opened flow hydrograph at this location matches the recorded gauge flow hydrograph very well. When the modeled gates closed flow hydrograph is compared to the recorded flows at the Piney Point gauge (see **Figure B-9** for hydrographs at USGS 08073700 in **Appendix B**), a distinct decrease in the sustained flow rate is very pronounced. The gates closed flow rate drops from nearly 11,000 cfs to approximately 2,000 cfs in less than two days. The gates opened hydrograph shows the prolonged and sustained flow rates at elevated flood levels for a much longer duration when compared to the gates closed scenario.

In considering the plaintiff testimony and general trends of the modeling, **it is my opinion that a substantial increase in duration of inundation (on the order of 12 days) from a modeled duration of approximately 48 hours under the gates closed scenario, was caused solely by the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM, and that such additional inundation of and associated damage to the property would not have occurred if the gates had remained closed.**

7.7.2 Property 12 – Stahl

The property located at 265 Chimney Rock Road was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony. The plaintiff testified that the property was inundated with up to 3.33 ft of water above the building slab elevation of 52.10 ft.

Downstream of the Piney Point gauge (USGS 08073700), the 1D HEC-RAS model appears to under estimate the peak flow and water surface elevation as compared to reported values by the USGS gauge. Due to the lack of direct observations of flood inundation by the plaintiff, a thorough calibration of the model at this location was not feasible. Without the support of direct observations of the flood inundation of the property, I am unable to present an informed opinion of the full cause or duration of the inundation attributed to the induced surcharge releases.

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7.8 **Opinion 8: Inundation of Properties in Zone 7**

7.8.1 **Property 13 – Welling**

The property located at 5731 Logan Lane was reported to have been damaged by the induced surcharge releases in response to Hurricane Harvey based on the plaintiff testimony. In addition, Dutch Lindeburg (2018) testified that inundation of the property began on 28 August 2017, with an observed depth of approximately 3 ft above the first floor slab elevation of 47.40 ft. Mr. Lindeburg's testimony reported an additional 1.5 ft of inundation (with a total depth of approximately 4.5 ft) occurred by 2:00 am 29 August 2017. The 1D HEC-RAS model does not adequately predict the significant flows within the channel at this point; however, the USGS gauge 08074000 Buffalo Bayou at Houston is in close proximity to the property to provide recorded flow data.

In considering the plaintiff testimony and general trends of the USGS gauge, **it is my opinion that the observed increase in inundation on 29 August 2017 could reasonably be the result of the induced surcharge releases conducted by the USACE in general accordance with the 2012 WCM on 28 August 2017.**

7.9 **Summary of Conclusions**

During and after Hurricane Harvey, Addicks and Barker Reservoirs were operated in a manner that caused downstream flooding as a result of induced surcharge operations. Induced surcharge operations had the effect of mitigating upstream inundation, to the detriment of downstream properties, which experienced inundation that otherwise would not have occurred. At the time of Hurricane Harvey, USACE knew – with specificity to streets, blocks, or intersections – the downstream impact of its decision to release water from Addicks and Barker Reservoirs pursuant to the 2012 WCM's induced surcharge procedures. As explained in this Report, action undertaken by USACE to open the Addicks and Barker gates was the decision that caused the downstream test properties to be inundated, and those properties would not have been inundated, and/or would not have been inundated to the extent experienced during and after Hurricane Harvey, but for the induced surcharge release⁵. This decision to abandon from the long-standing policy of protecting downstream properties increased the duration and depth of inundation.

⁵ No conclusions can be reached to a reasonable degree of scientific and engineering probability with respect to downstream test property #12 Stahl.

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SECTION 8

INITIAL OPINION ON ADDICKS AND BARKER SPILLWAY AND OUTLET WORKS

Geosyntec participated in a one-day duration site visit to the Addicks and Barker Reservoirs hosted by representatives of USACE. At the time of the site visit, work was progressing on the new outlet structures at both dam sites. The purpose of the site visit was to observe first-hand the condition of the dams and specifically the current conditions at the north end of Addicks Dam. This area was subjected to local overtopping and flood waters flowed around the end of the reservoir containment system. Prior to and after the site visit, Geosyntec reviewed numerous documents related to: (i) historical concerns published by USACE regarding safety of the two dams and outlet works, (ii) historical rehabilitation measures for the dams and outlet works, (iii) current rehabilitation efforts at the outlet works; (iv) the 1962 RRM and 2012 WCM; and (v) performance of the dams during Hurricane Harvey. Based on review of these documents, Geosyntec has developed the following observations:

- Hurricane Harvey resulted in pool levels of 109.09 ft (Addicks) and 101.56 ft (Barker). These pool levels were well within the design conditions of the reservoirs.
- The 2012 WCM allowed the gates to be opened resulting in significant releases of flood waters to Buffalo Bayou.
- The actions taken by USACE followed the 2012 WCM in that the gates were opened when pool levels in the reservoir reached elevation 101.0 ft (Addicks) and 95.7 ft (Barker). Furthermore, Geosyntec concurs that the USACE response to inspections and assessments during Hurricane Harvey were appropriate.

These observations notwithstanding, the operations of the outlet works during Hurricane Harvey in accordance with the 2012 WCM had significant consequences to Buffalo Bayou that have been well documented in other sections of this Report. Based on review of the history of Addicks and Barker flood control systems (i.e., levees and outlet works), Geosyntec provides the following opinions:

- When water levels in the Addicks Reservoir exceeded approximately elevation 108.0 ft, water was “naturally” released (or flanked) around the north end of Addicks Dam. By USACE assessment... *“This release was observed to be limited to low velocity sheet flows.”*
- The current condition of the dam at the north end of the Addicks Reservoir includes levees of limited height that are protected from overtopping by roller-compacted concrete. The levee in this area appeared to be undamaged by the overtopping during Hurricane Harvey. These protected levees could have sustained significantly higher floodwaters than imposed

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during Hurricane Harvey, as the velocity of flow would likely remain quite low, due to the local topography.

- In response to dam safety concerns identified by USACE, rehabilitation efforts were completed by USACE after publication of the 1962 RRM to improve performance of the outlet works (i.e., mitigate potential for excessive seepage and piping). The previous (i.e., pre-Hurricane Harvey) maximum pool of record (i.e., elevation 102.65 ft (Addicks) and 95.2 ft (Barker)) were reached in 2016 and provided a full-scale demonstration of the effectiveness of rehabilitation activities at the outlet works completed since imposition of the 2012 WCM. Therefore, it was not necessary from a dam safety perspective to open the gates. In fact, post-Hurricane Harvey assessment has shown that primarily due to the natural flanking release at the north end of the Addicks Reservoir, there was little impact on impounded flood water elevation when the gates were opened.
- It is Geosyntec's opinion that had the gates not been opened during Hurricane Harvey, the maximum pool levels would not have changed significantly and there would have been no significant decrease in dam safety due to levee instability and/or seepage and piping.

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SECTION 9

PRELIMINARY OPINIONS REGARDING DEFENSES THAT MAY BE RAISED

9.1 Introduction

Geosyntec has been informed that USACE may choose to advance legal theories or defenses predicated on a hypothetical scenario assuming that the reservoirs were never constructed. Geosyntec expresses no opinion regarding the legal validity of any such theories or defenses. To evaluate such a hypothetical scenario, we investigated reasonable stormwater management and infrastructure improvements that would be expected from the time the dams were built in the 1940s until the time of Hurricane Harvey in 2017. In addition to these infrastructure improvements, it is reasonable to assume that the land development regulations, land use, stream buffers, and other development over the roughly 70 years from the time the dams were built to 2017 would have varied considerably. These variations would have been driven by Federal regulations, local ordinances, and land development pressures.

9.2 Flood Protection Measures

After the devastating floods of 1929 and 1935, the State of Texas created the Harris County Flood Control District (HCFCD) in 1937 for the purpose of “the control, storing, preservation, and distribution of the storm and flood waters, and the waters of the rivers and streams in Harris County and their tributaries, for domestic, municipal, flood control, irrigation, and other useful purposes, the reclamation and drainage of the overflow land of Harris County, the conservation of forests, and to aid in the protection of navigation on the navigable waters by regulating the flood and storm waters that flow into said navigable streams” (*FEMA FIS, Jan 6, 2017*) *The Flood Insurance Study (FIS) for Harris County, TX and Incorporate Areas dated January 6, 2017*.

The FIS states that “since that time (i.e. 1937), there have been many significant projects to reduce flood damage in Harris County. Many of these projects are the results of partnerships between the HCFCD and the U.S. Army Corps of Engineers (USACE), Federal Emergency Management Agency (FEMA), and others.” It is reasonable to assume that if the two dams were not constructed, the HCFCD and their partners would have continued their efforts to evaluate and implement a range of alternative flood mitigation practices and flood protection measures to address land development pressure.

Reasonable alternatives to the dams which would have been required to maintain a level of land development along Buffalo Bayou are expected to include:

- channel modifications such as widening, straightening, and/or lining the bayous to improve downstream conveyance;

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- additional levees around property to protect against extreme flood events within the bayous;
- improved bridge standards in terms of bridge elevation, design flows, and structural support;
- the use of detention and/or retention ponds to decrease peak flow rates and/or runoff volumes;
- residential development changes in downstream properties with respect to density, impervious cover, and proximity to bayous;
- additional diversion channels, local conveyance systems, and bypass channels to allow for multiple flow paths within the built environment;
- stormwater runoff and drainage plans for an integrated approach to the improved management and control of runoff;
- regulatory land development code changes related to building location, minimum elevation of structures or homes above the base flood elevation, and local drainage controls; and
- revised regulatory Flood Insurance Studies prepared by FEMA to map and delineate flood risk zones.

The central and common element influencing the implementation of flood mitigation practices and flood protection measures within the area of interest of this Report is the flooding along Buffalo Bayou. The purpose of each practice or measure is to reduce the risk of damage or loss of life, as was central to the original formation of the HCFCD. This idea was reinforced when Congress created the National Flood Insurance Program (NFIP) in 1968 to reduce flood losses and disaster relief cost by guiding future development away from flood hazard areas where practicable, requiring flood resistant design and construction, and transferring costs of losses to floodplain occupants through flood insurance premiums.

As is noted on the HCFCD website (HCFCD.org), examples of flood mitigation include elevating homes and business above the base flood, relocating homes out of the floodplain, and minimizing the vulnerability to flood damage through both structural and nonstructural means. An important element of the NFIP is the adoption of ordinance and development codes at the local level that protect structures. One such example is the City of Houston's requirement to construct buildings with a finish floor at least two feet higher than the 500-year floodplain. This reinforces that if the two dams were not constructed in the 1940s, alternative flood mitigation practices and flood protection measures would have been evaluated, which would have included the establishment of ordinances and development codes to protect structures.

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9.3 Deposition Testimony

Several of the testimonies given by the range of professions with knowledge of the flood control and flood protection systems in the Houston area, express agreement that alternative measures would likely have been evaluated and implemented if the two dams were not constructed.

We agree with **Jeff Lindner** (chief meteorologist, HCFCD) who stated in the deposition testimony that had no dams been built, “there definitely probably would have been some engineering studies” performed to evaluate the best flood control projects. Mr. Lindner stated that if Addicks and Barker Reservoirs had not been constructed, the area along Buffalo Bayou would be uninhabitable, assuming if no other measures were implemented. From the deposition, Mr. Lindner concurred that reasonable flood risk management alternatives include:

- concrete lining of the bayou;
- widening, deepening, removing obstacles and straightening of the bayous;
- levees;
- diversion channels;
- storm drains and pipes constructed by municipalities;
- local codes for developers to build flood control systems;
- zoning to ensure that future development is constructed at an elevation that would potentially remove structures from various floodplains as an alternative for flood risk management; and
- not developing land in areas that are prone to inundation is an alternative for flood risk management.

We agree with **Jamila Johnson** (flood control manager, City of Houston) who stated in the deposition testimony that if no dams were constructed, the floodplain would be different. She indicated that the City of Houston would still require buildings to be built two feet higher than the 500-year floodplain. When compared to current flood protection elevations, Ms. Johnson indicated that higher flood protection elevations would be required if no dam was constructed, or else there would be no building at all along Buffalo Bayou. We concur that if the dams were not constructed, the floodplain would likely be higher and would require buildings to be raised to a higher elevation to provide the same two feet of freeboard above the 500-year floodplain.

In the deposition testimony, **Braxton Coles** (drainage maintenance, City of Houston) expressed his opinion that the damage was not caused by the City’s storm drain system. Based on his experience, rainwater typically drains in Houston within one day. After Harvey, his crews inspected the system and found the drainage system was in good working order, and thus it is his opinion that the water staying for a week later was not caused by the City’s system.

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9.4 Flood Risk Mapping

Through the National Flood Insurance Program (NFIP), FEMA is the recognized source for flood risk information. Residents can readily research and understand their flood risk with online mapping tools and obtaining readily available information such as the FIS, Water Surface Profiles, and FEMA Flood Insurance Rate Map (FIRM). These collectively provide information to homeowners making informed decisions. The current FIS for Harris County, TX and Incorporate Areas is dated 6 January 2017, prior to Hurricane Harvey.

Section 2.4 “Flood Protection Measures” of the FIS states that the dams help protect the City of Houston from floodwaters. Water is stored only for flood control and is released when flooding is no longer a danger. When significant runoff producing storms occur, the gates are closed and remain closed until the peak at Piney Point passes and the discharge drops below 2,000 cfs. Reservoir releases will not be made any time the 2,000 cfs limit is exceeded (considered a non-damaging discharge) in Buffalo Bayou at Piney Point.

9.5 Opinions

We believe based on reasonable probability and engineering judgement that alternative flood protection measures to the Addicks and Barker Dams would have been considered and built over the past 70 years of development, if the two dams were not constructed. These alternatives, which would have included stormwater management, flood protection and mitigation, and improved conveyance, would have likely provided similar or better protection to the 13 downstream test properties when compared to the performance of the Addicks and Barker Dams during Hurricane Harvey.

- It is reasonable to assume that other alternative flood protection measures would have been implemented in place of the reservoirs if they were not constructed. The alternative measures would have included structural practices and policies or ordinances to limit where development occurred and how structures are constructed.
- Alternative structural measures and practices would have likely included:
 - improvement of channel conveyance by lining the bayous with concrete or armoring;
 - improvement of channel conveyance by making the bayou channel wider, deeper, straighter, or by removing obstructions;
 - construction of levees to limit inundation;
 - construction of diversion channels;
 - expansion of culverts, trunk storm sewers, drains, and local stormwater management systems; and

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- control of stormwater runoff from development by the construction of detention basins as part of private land development to offset potential increases to flood flows.
- Alternative policies and ordinances that would have been implemented are likely to have included:
 - local codes to require developers to construct stormwater management systems, such as detention basins to control runoff from development;
 - local codes to require developers to evaluate flood risk and construct appropriate flood control or management systems to protect their proposed developments;
 - local codes to protect structures from damage, such as raising the building or critical facilities two feet above the 500-year floodplain or requiring the use of flood proof material; and
 - local codes to restrict development in the floodplain and require mitigation measures if the floodplain is impacted by development. An example includes the requirement that proposed fill in the floodplain must be offset by appropriate compensating volume.

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SECTION 10

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Appendix A1

Matt Bardol Background

Including:

- C.V.
- List of Publications Authored in the Previous 10 Years
- List of Cases in Which he Testified in Trial or Deposition for the Previous 4 Years
- Fee Schedule

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Appendix A2

Bob Bachus Background

Including:

- C.V.
- List of Publications Authored in the Previous 10 Years
- List of Cases in Which he Testified in Trial or Deposition for the Previous 4 Years
- Fee Schedule

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Appendix B

HEC-HMS and 1D HEC-RAS Model Analyses



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Appendix C

Enhanced 2D HEC-RAS Model Analysis



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Appendix D

Inflow Time Series Analysis



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Attachment 1

FEMA Flood Insurance Study Flood Profiles and Table 3

(source: FEMA, 2017)

